Anallerg®-NFA

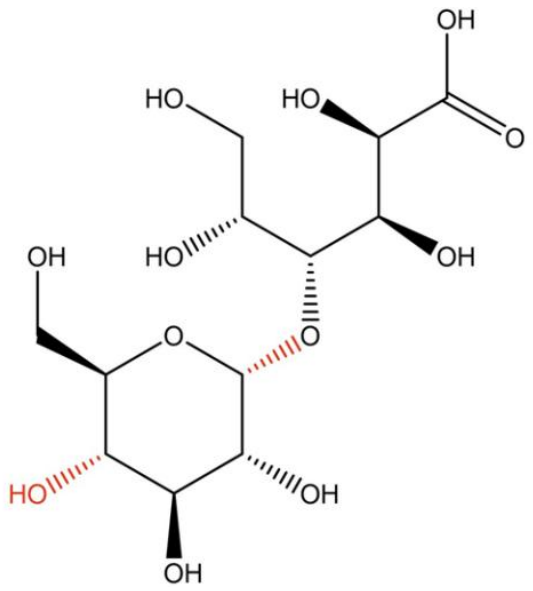
INCI：Maltobionic acid

CONTENT

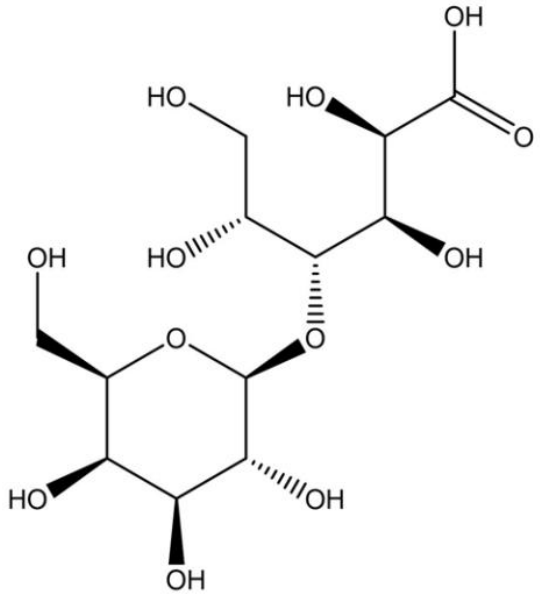
01

Background

Maltobionic acid VS Lactobionic acid



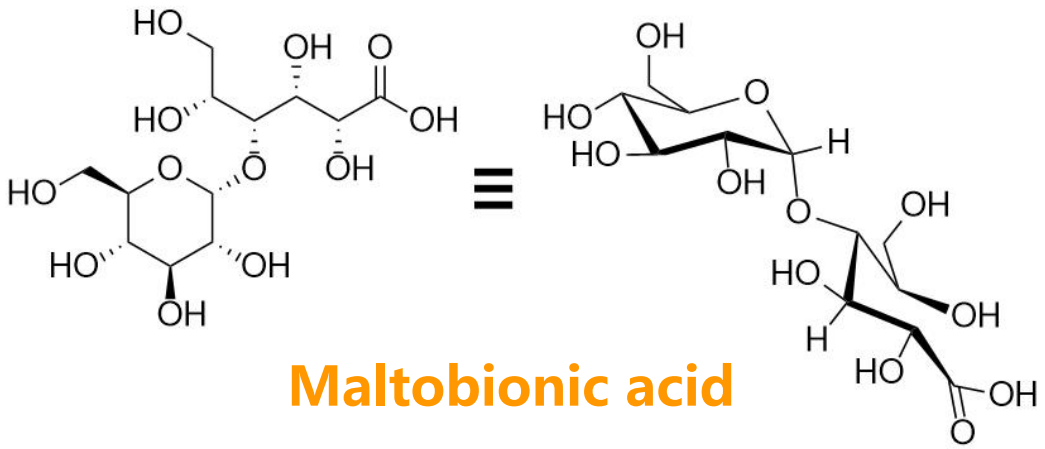
Maltobionic acid



Lactobionic acid

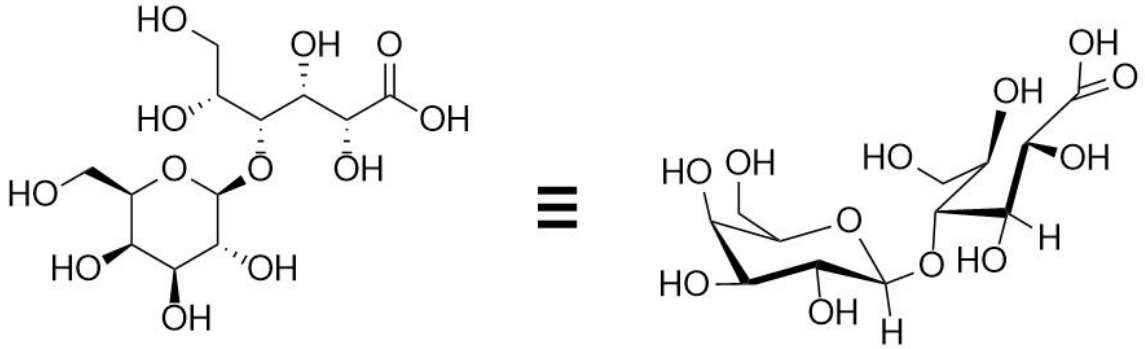
The two are structural isomers of each other. Maltobionic acid, like lactobionic acid, has multiple efficiencices, and mild properties, but without the sticky feel on the skin

Maltobionic acid VS Lactobionic acid



Maltobionic acid

(Plant Source)

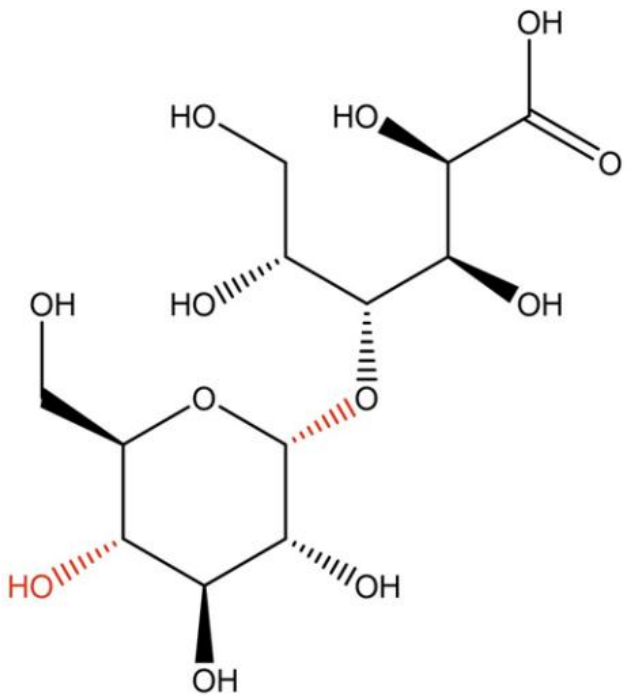


Lactobionic acid

(Animal Source)

The two are structural isomers of each other. Maltobionic acid, like lactobionic acid, has **multiple efficiencices,** and **mild properties**, but **without the sticky feel** on the skin

Maltobionic acid



Maltobionic acid

Cosmetics

Buffer compound Anti-ageing Anti-ageing
Chemical exfoliant Skin care agent Moisturizer

Pharmaceutics

Drug for mineral deficiency Nanoparticle
Digestive aid

Food and beverage

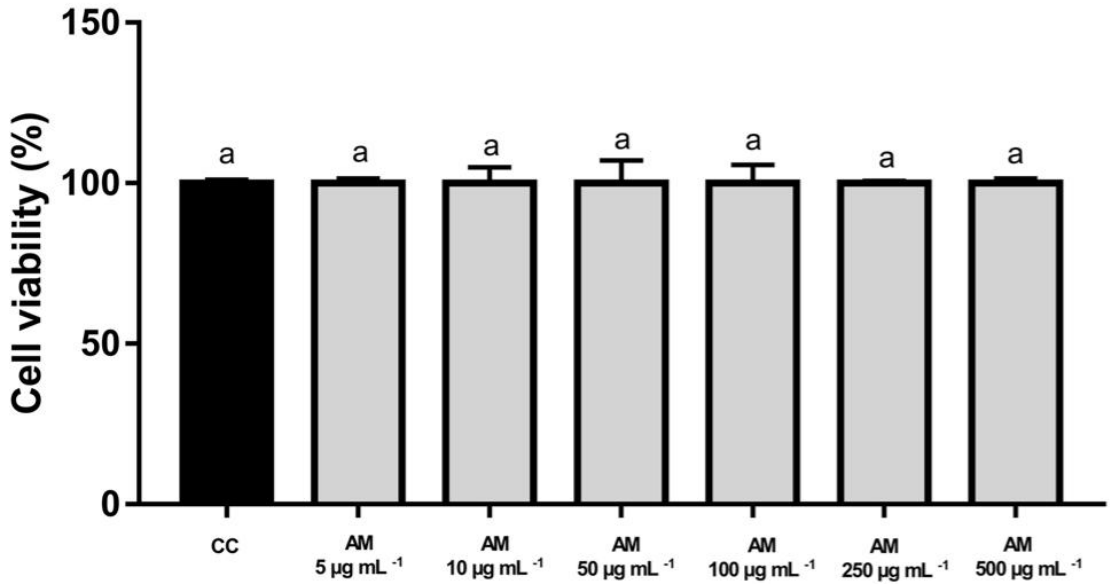
Dietary supplement Taste enhancer
Antioxidants

Chemical industry

Stabilizer Chiral selector

Maltobionic acid —— Antioxidant

A



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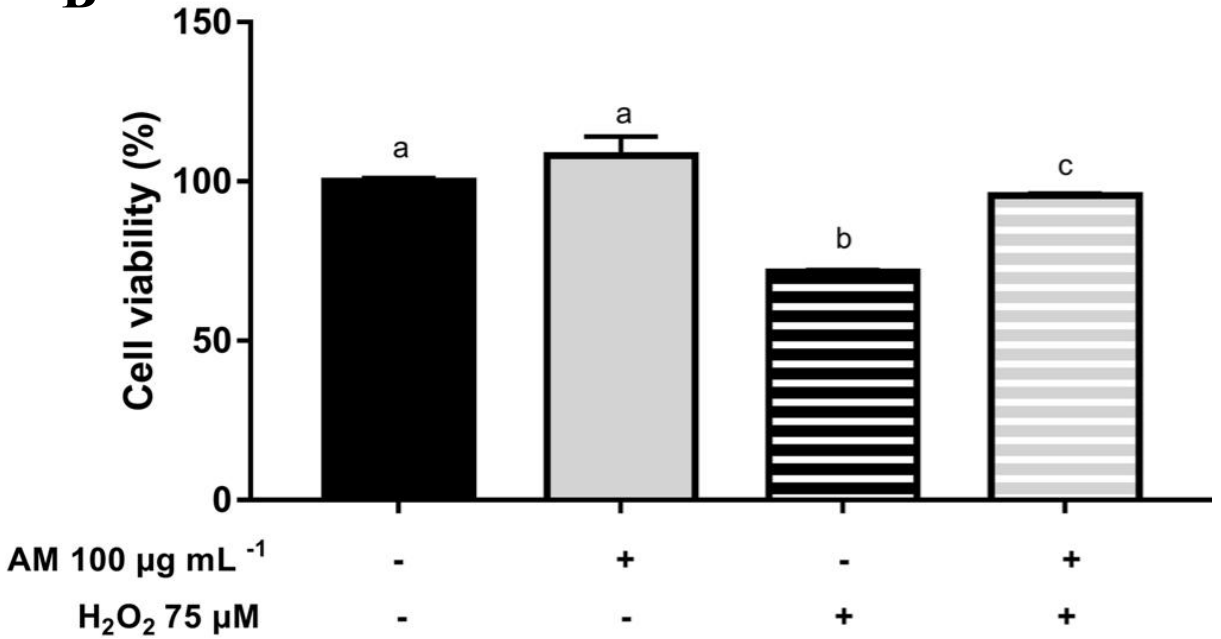
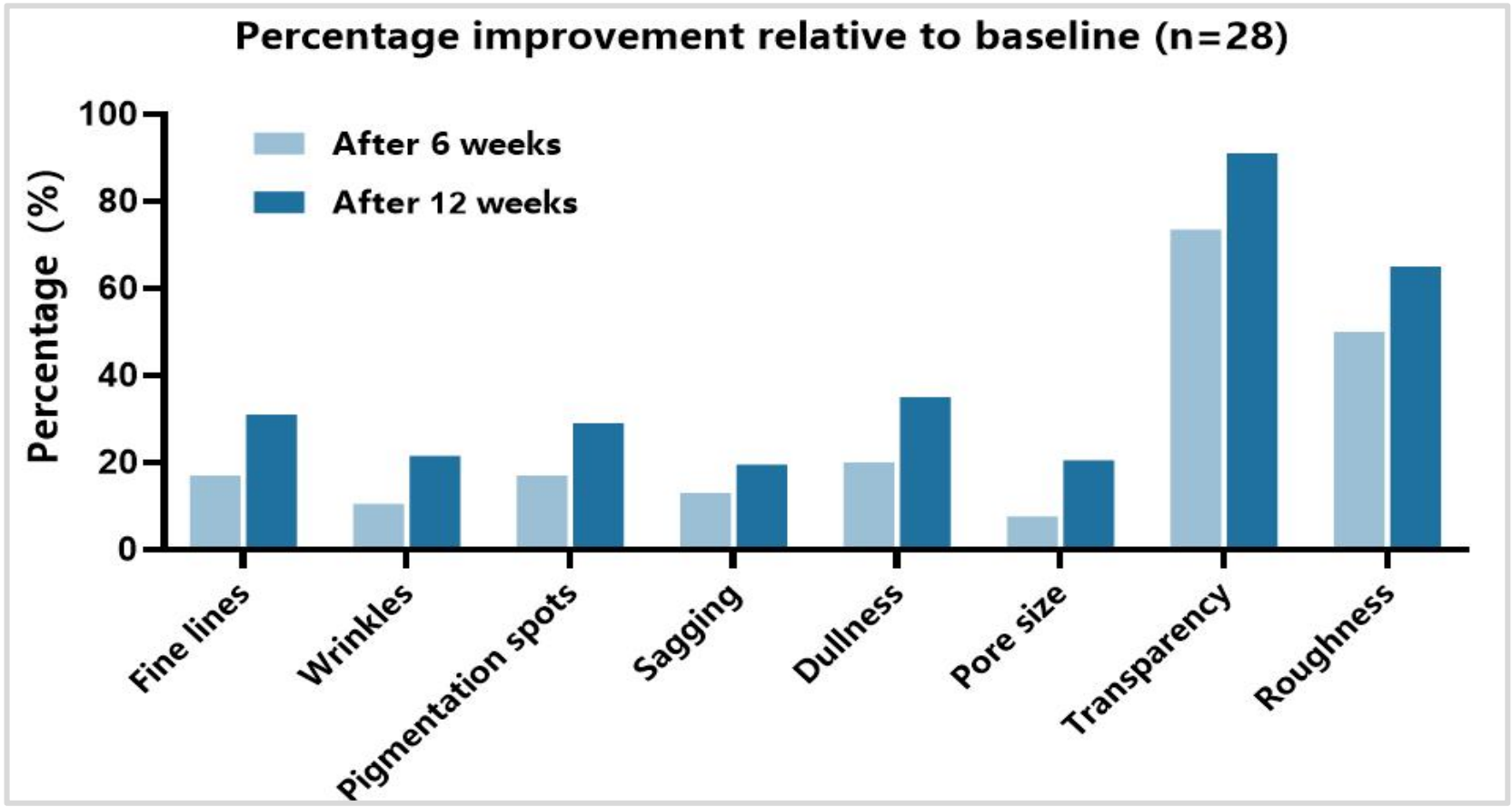


Maltobionic acid protects cells from H_2O_2-induced damage and acts as an antioxidant

de Souza, et al.3 Biotech 14.1 (2024): 32.

Maltobionic acid —— Anti-photoaging

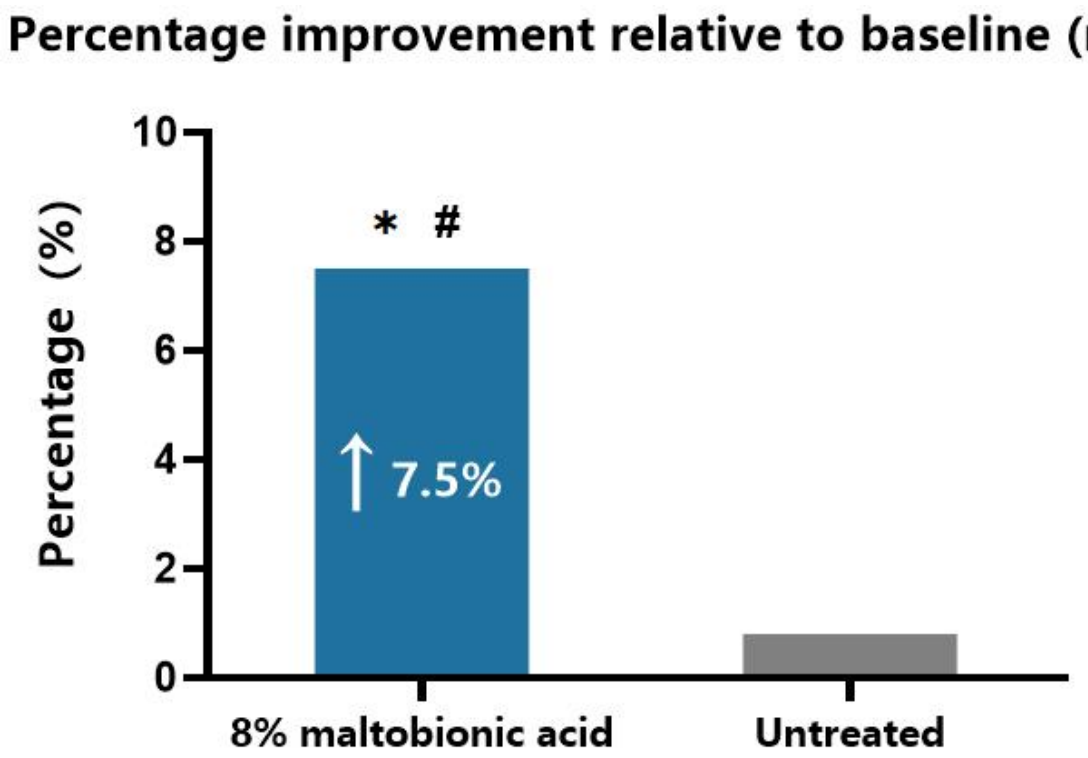


- 28 female subjects.
- Applied a cream containing **8% maltobionic acid**
- Topically twice daily for 12 weeks.
- **After 6 and 12 weeks, significant improvements in photoaging were observed.**

Maltobionic acid can improve photoaging and has anti-photoaging effects

Zoe Diana Draelos, Xu Detian. Cosmeceuticals[M]. 3rd edition: People's Medical Publishing House, 2018.

Maltobionic acid —— Anti-photoaging

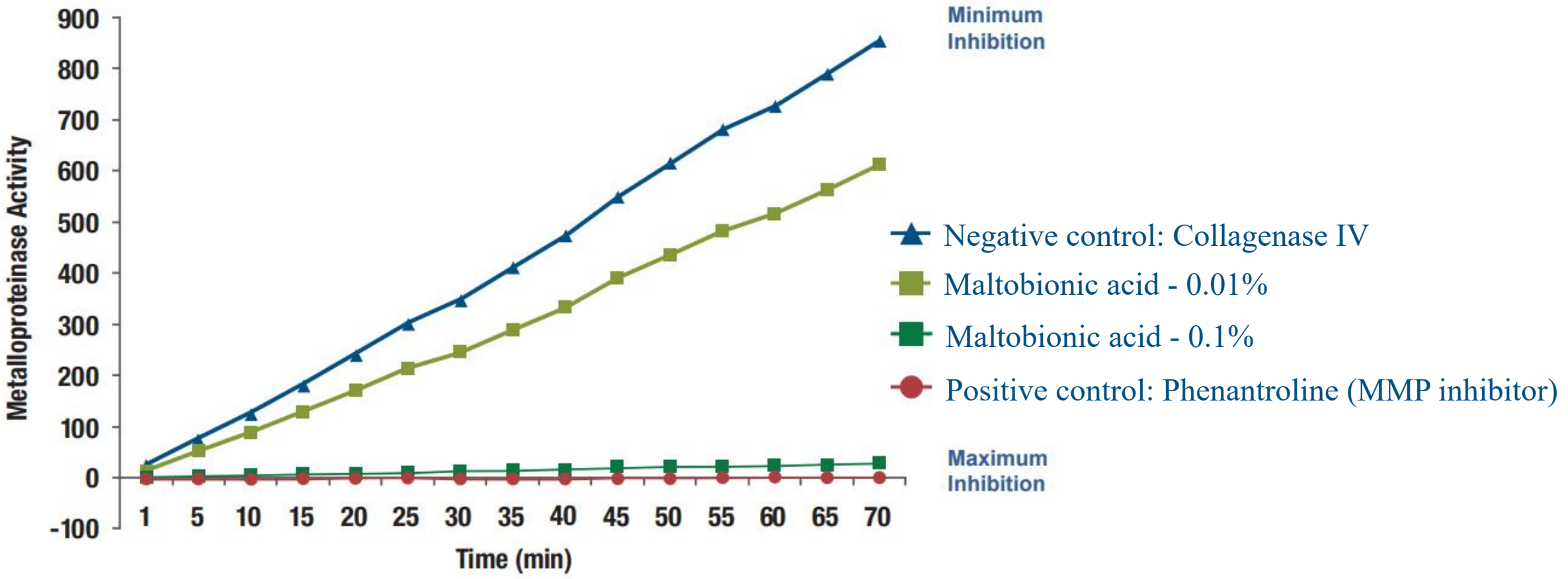


- 28 female subjects.
- Applied a cream containing **8% maltobionic acid**
- Topically Three times daily for 12 weeks.
- Skin thickness showed a significant increase compared to baseline ($P^* < 0.05$) and to the untreated group ($P\# = 0.0001$).
- **Forearm skin thickness increased significantly by 7.5%.**

Maltobionic acid can increase skin thickness, improve photoaging, and has anti-photoaging effects

Zoe Diana Draelos, Xu Detian. Cosmeceuticals[M]. 3rd edition: People's Medical Publishing House, 2018.

Maltobionic acid —— Anti-photoaging

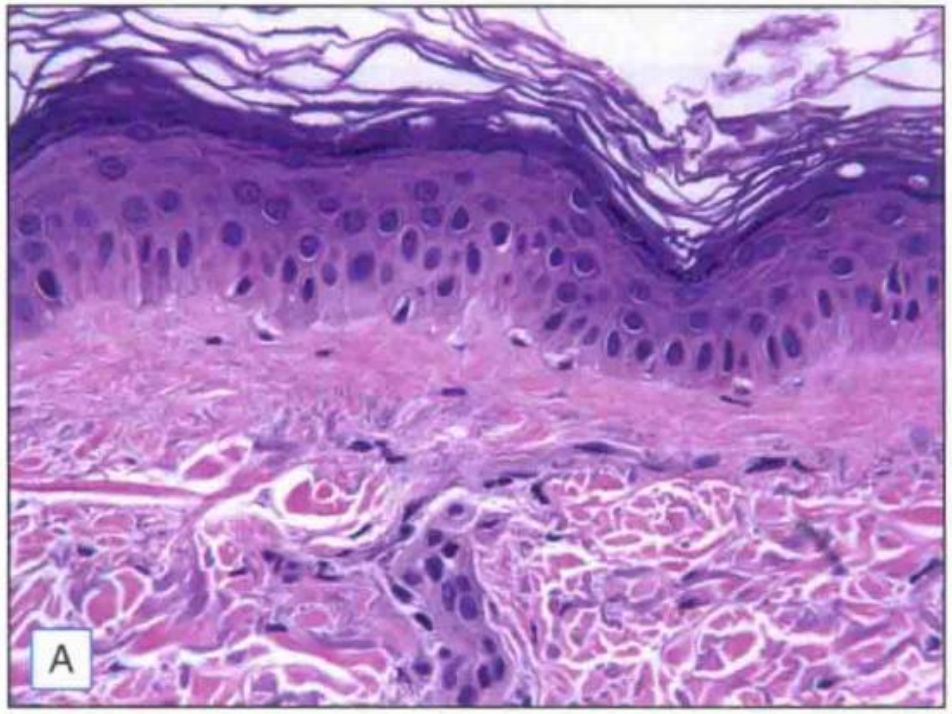


Maltobionic acid inhibits matrix metalloproteinase (MMP) activity, and has anti-photoaging effects

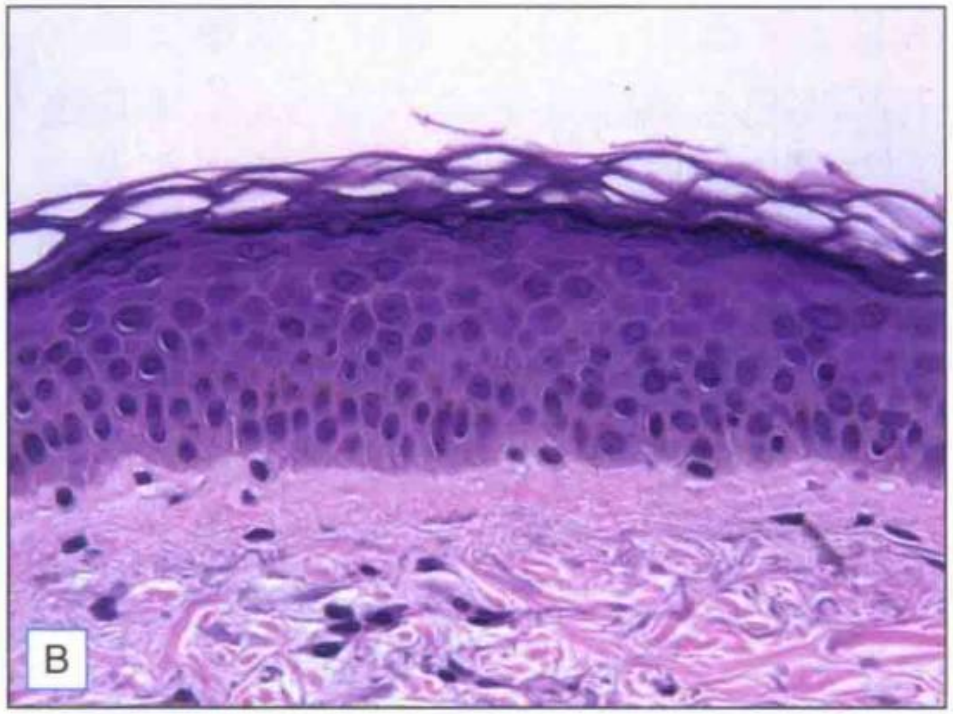
Irina Brouda, MA, et al.Maltobionic Acid, a Powerful yet Gentle Skincare Ingredient with Multiple Benefits to Protect Skin and Reverse the Visible Signs of Aging.NeoStrata Company, Inc., Princeton, NJ, USA

Maltobionic acid —— Anti-photoaging

Untreated



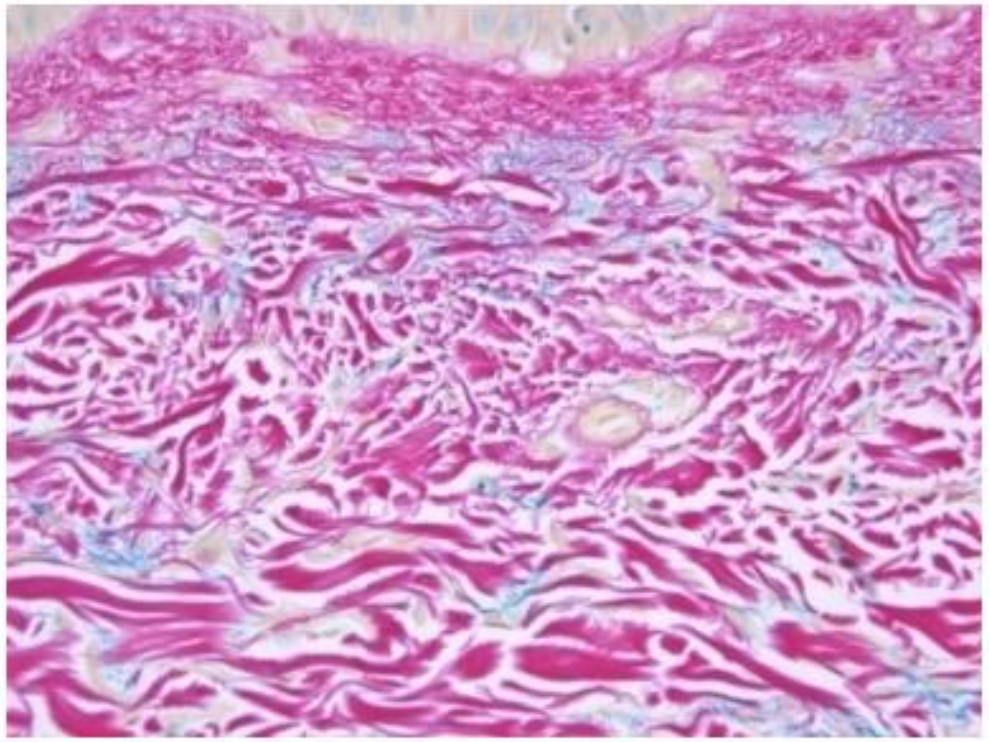
8% maltobionic acid for 12weeks



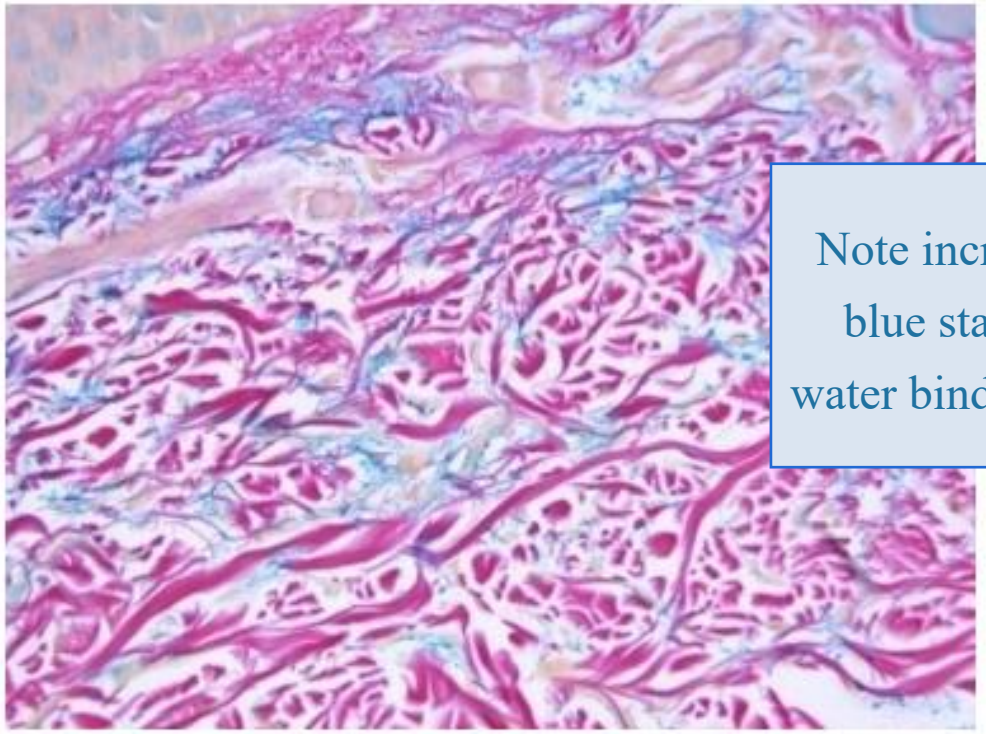
Maltobionic acid can thicken the epidermis, and has anti-photoaging effects

Zoe Diana Draelos, Xu Detian. Cosmeceuticals[M]. 3rd edition: People's Medical Publishing House, 2018.

Maltobionic acid —— Anti-photoaging



Untreated



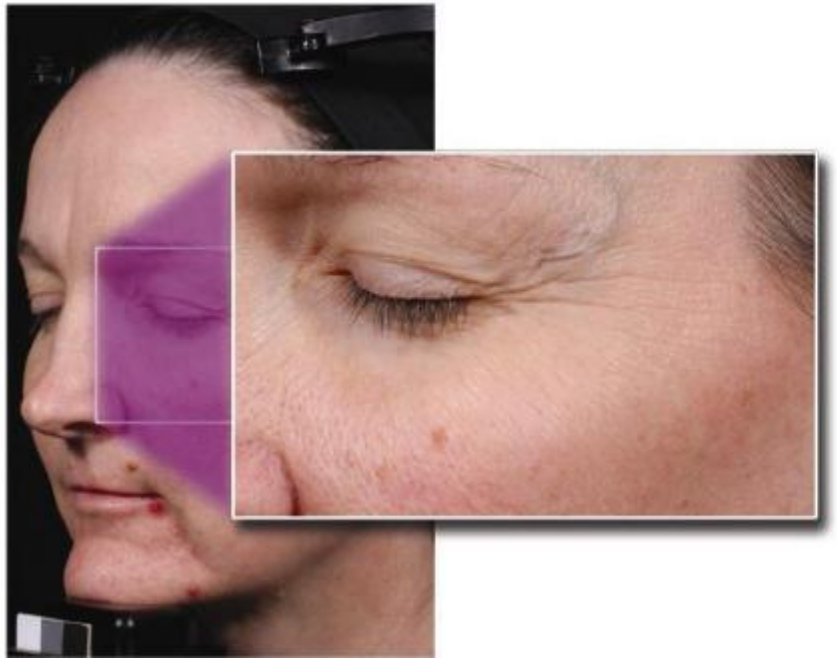
8% maltobionic acid for 12weeks

Note increased density of blue stain representing water binding GAGs in skin

Maltobionic acid increases water-binding GAGs (hyaluronic acid) in the skin to plump, firm, and smooth wrinkles from the inside out

Zoe Diana Draelos, Xu Detian. Cosmeceuticals[M]. 3rd edition: People's Medical Publishing House, 2018.

Maltobionic acid —— Anti-photoaging



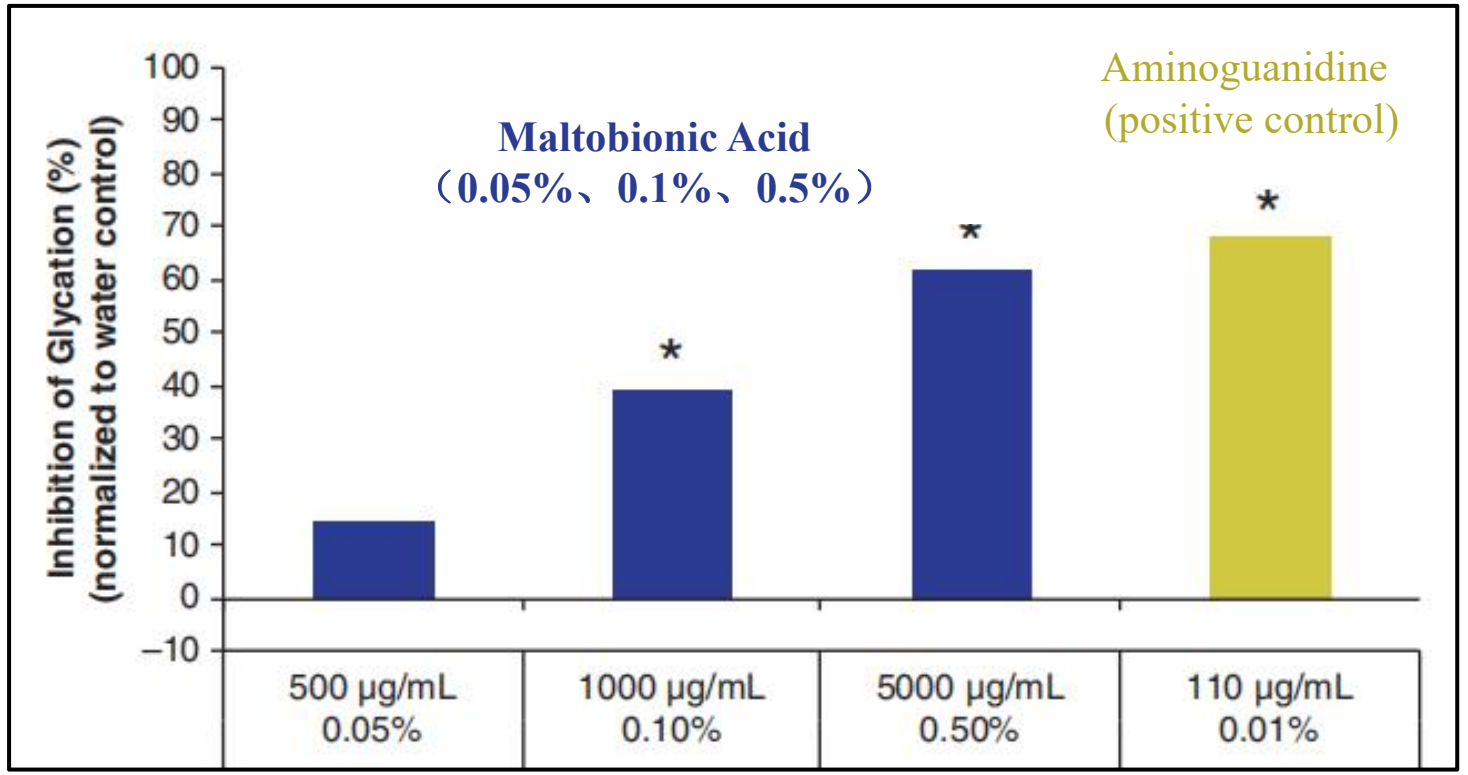
Untreated

8% maltobionic acid for 12weeks

Maltobionic Acid reduces wrinkles and smoothes skin texture

Brouda I, Edison BL, Weinkauf RL, Green BA. . Am Acad of Dermatol Poster Exhibit: Chicago, August 2010.
Green BA, Edison BL, Wildnauer RH. Am Acad of Dermatol 2006;54(3):AB37.

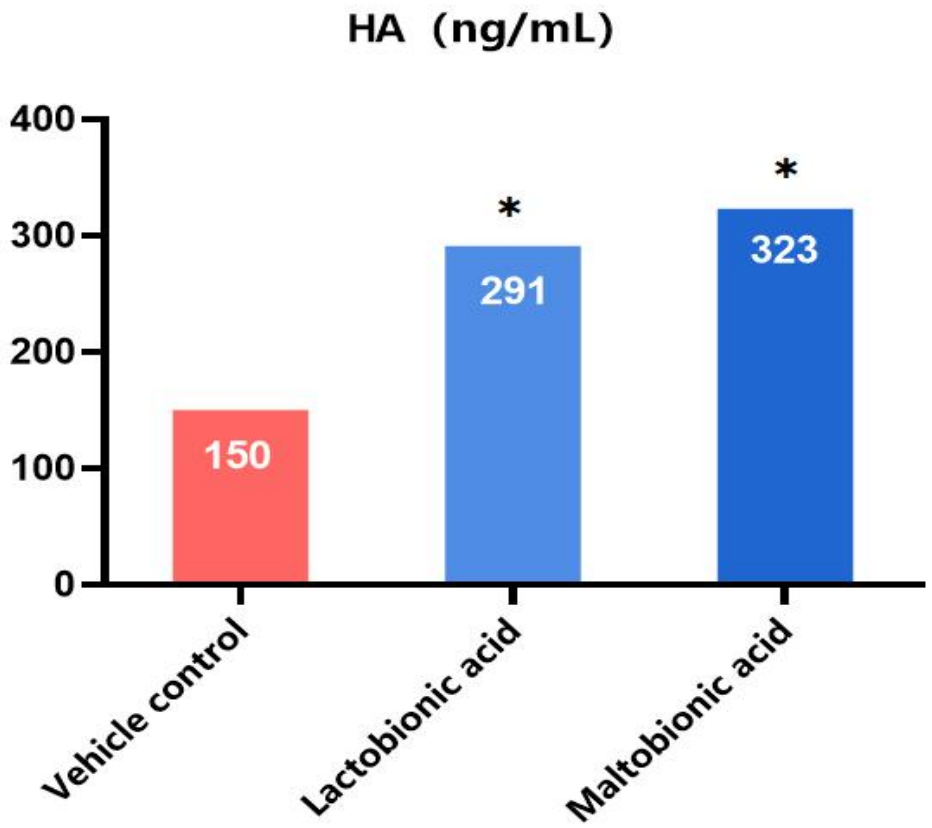
Maltobionic acid —— Inhibits skin glycation



Maltobionic acid showed a significant, dose-dependent inhibitory effect on non enzymatic glycation

Barbara A. Green, RPh, MS, et al.Antiaging Bionic and Polyhydroxy Acids Reduce Non-Enzymatic Protein Glycation and Skin Sallowness.Sunny BioDiscovery, Inc., Santa Paula, CA, USA

Maltobionic acid —— Promotes HA synthesis

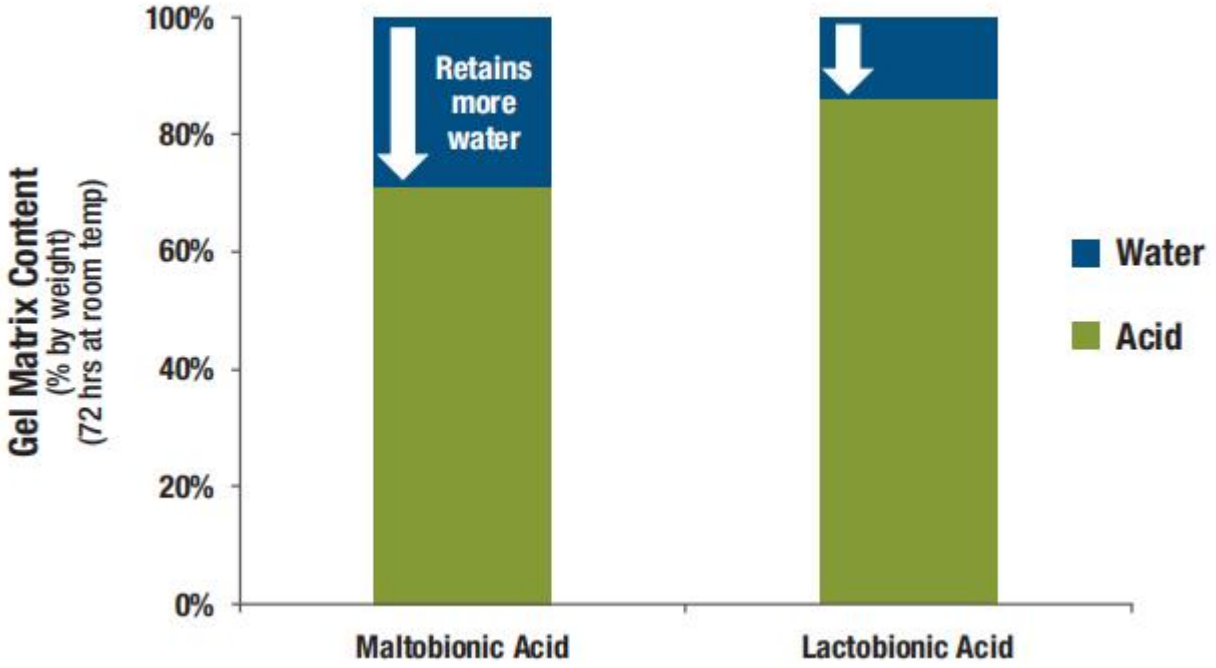


- Fibroblasts from elderly skin were treated with lactobionic acid and maltobionic acid for 48 hours to measure HA levels.
- Both acids significantly increased HA, with **maltobionic acid showing better results**.

Maltobionic acid promotes HA synthesis more effectively than lactobionic acid

Zoe Diana Draelos, Xu Detian. Cosmeceuticals[M]. 3rd edition: People's Medical Publishing House, 2018.

Maltobionic acid —— Moisturizer



- Aqueous solutions (1 g of material dissolved in 1 ml of water) of maltobionic acid and lactobionic acid, were allowed to evaporate at room temperature for up to 96h.
- **Maltobionic acid（29%） binds more water than lactobionic acid（14%） during free evaporation of their respective aqueous solutions**

Maltobionic acid binds more water than lactobionic acid

Yu, Ruey J., and Eugene J. Van Scott. Journal of cosmetic dermatology 3.2 (2004): 76-87.

Maltobionic acid —— Prevents post-sun pigmentation

➢ UV-Induced Lipid Peroxidation

Rationale	Test Materials	Results and Implications
UV light exposure generates O_2 free radicals that break down polyunsaturated fatty acids in cell membranes and mitochondria and damage cells. Inhibitors of lipid peroxidation scavenge free radicals and retard cell aging.	Maltobionic Acid (0.0001% - 0.1% solutions) Negative Control: Water Positive Controls: Vitamin C, Vitamin E	-Maltobionic acid reduced the production of malondialdehyde, an oxidative degradation product, thus acting as an antioxidant. Vitamins C and E demonstrated expected antioxidant activity. -Maltobionic acid is a moderate inhibitor of UV-induced lipid peroxidation. **-Maltobionic acid can act as a protective antioxidant in human skin.**

Maltobionic acid can act as a protective antioxidant in human skin

➢ Melanogenesis Inhibition in Cultured B16 Melanocytes

Rationale	Test Materials	Results and Implications
Exposure to sunlight stimulates melanin synthesis in melanocytes, which can lead to pigmentation irregularities such as age spots. Inhibitors of melanogenesis interfere with unwanted pigmentation.	Maltobionic Acid (0.0001% – 0.32% solutions) Negative Control: Water Positive Control: Kojic Acid + / - α-MSH*	-Maltobionic acid + α-MSH, and kojic acid + α-MSH inhibited melanin synthesis in cultured B16 melanocytes in a dose-dependent manner. -Maltobionic acid is a moderate inhibitor of MSH-stimulated melanogenesis. **-Maltobionic acid can help prevent hyperpigmentation after sun exposure.**

*All materials were tested in the presence (+) and in the absence (-) of α-melanocyte stimulating hormone (α-MSH) analog

Maltobionic acid can help prevent hyperpigmentation after sun exposure

Maltobionic acid can inhibit UV-induced lipid peroxidation, suppress melanin production, and prevent post-sun pigmentation

Barbara A. Green, RPh, MS, et al.Antiaging Bionic and Polyhydroxy Acids Reduce Non-Enzymatic Protein Glycation and Skin Sallowness.Sunny BioDiscovery, Inc., Santa Paula, CA, USA

Maltobionic acid —— Antibacterial

Strains	Maltobionic acid
	MIC（mg/mL）
Salmonella choleraes	8.50 ± 0.42
Escherichia coli	10.50 ± 0.52
Staphylococcus aureus	8.00 ± 0.40
Listeria monocytogenes	8.00 ± 0.35

- MIC represents the minimum concentration of a substance that inhibits visible microbial growth.
- **Maltobionic acid's MIC for bacteria ranges from 8 to 10.5 mg/mL.**

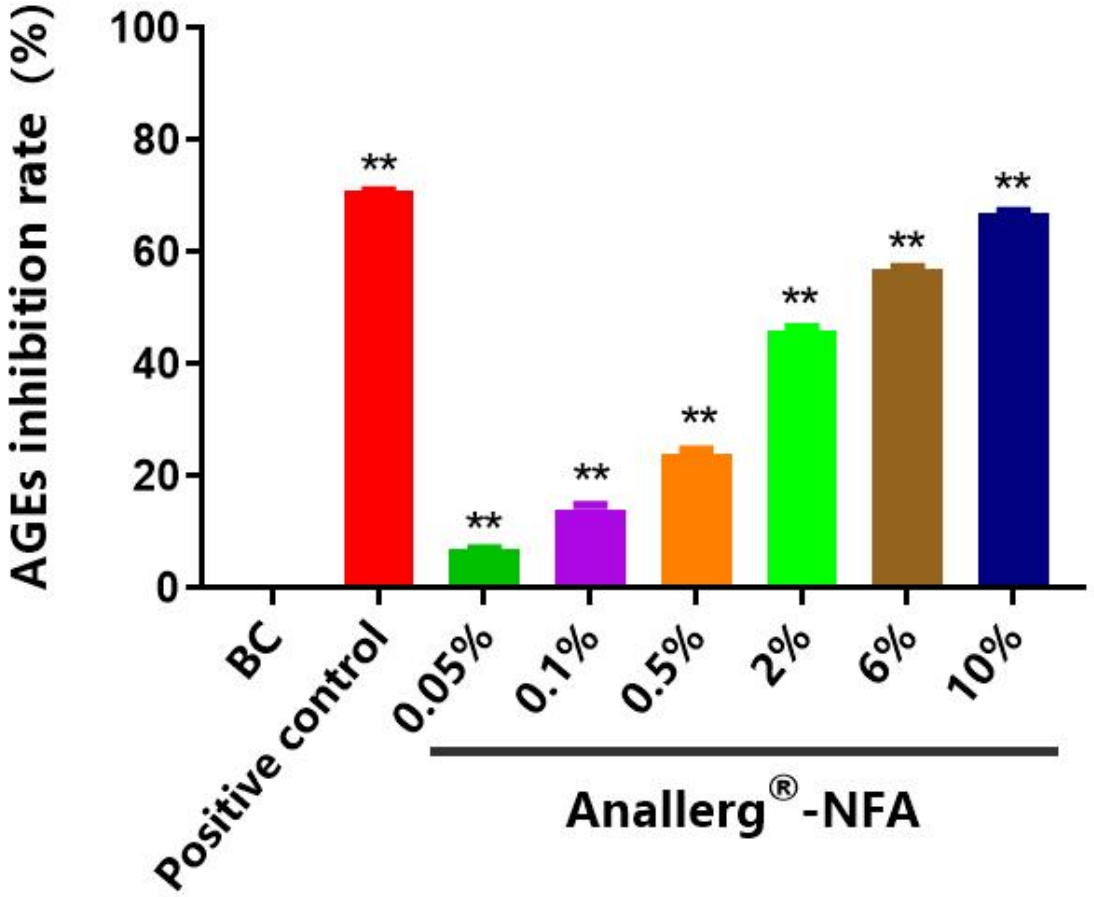
Maltobionic acid disrupts microbial cell membrane structure and has antibacterial properties

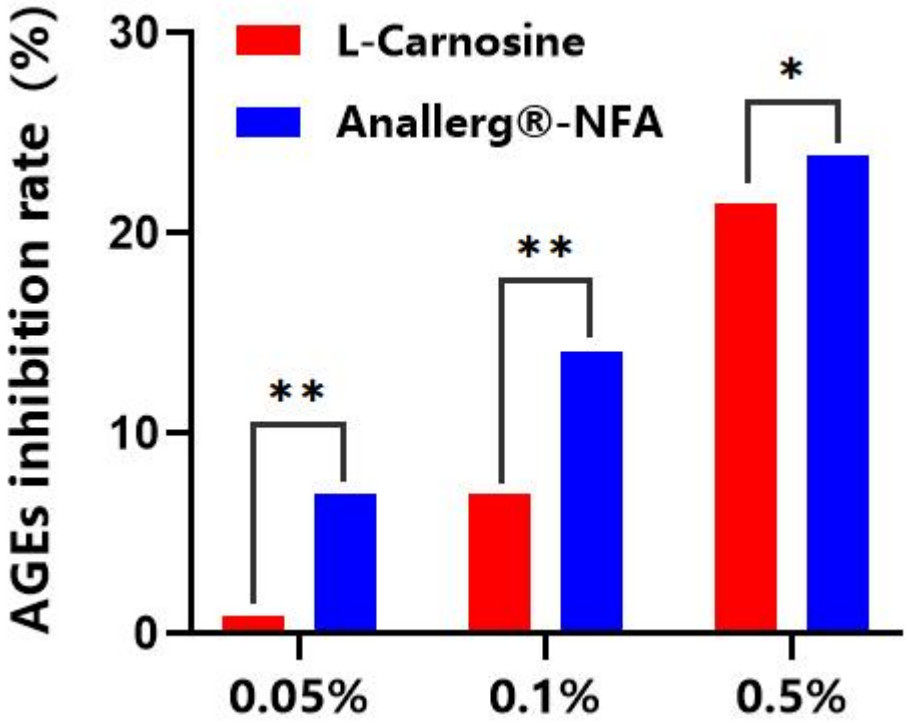
de Souza, et al.3 Biotech 14.1 (2024): 32.

02

Mechanism and efficacy verification

Anallerg®-NFA Inhibits skin glycation





Anallerg®-NFA showed a significant, dose-dependent inhibitory effect on AGEs, stronger than carnosine

Anallerg®-NFA Inhibits *Propionibacterium acnes*

- After treatment, the antibacterial effect of the test sample on *Propionibacterium acnes* at different concentrations is detected to determine the **Minimum Inhibitory Concentration (MIC)** of the test sample.

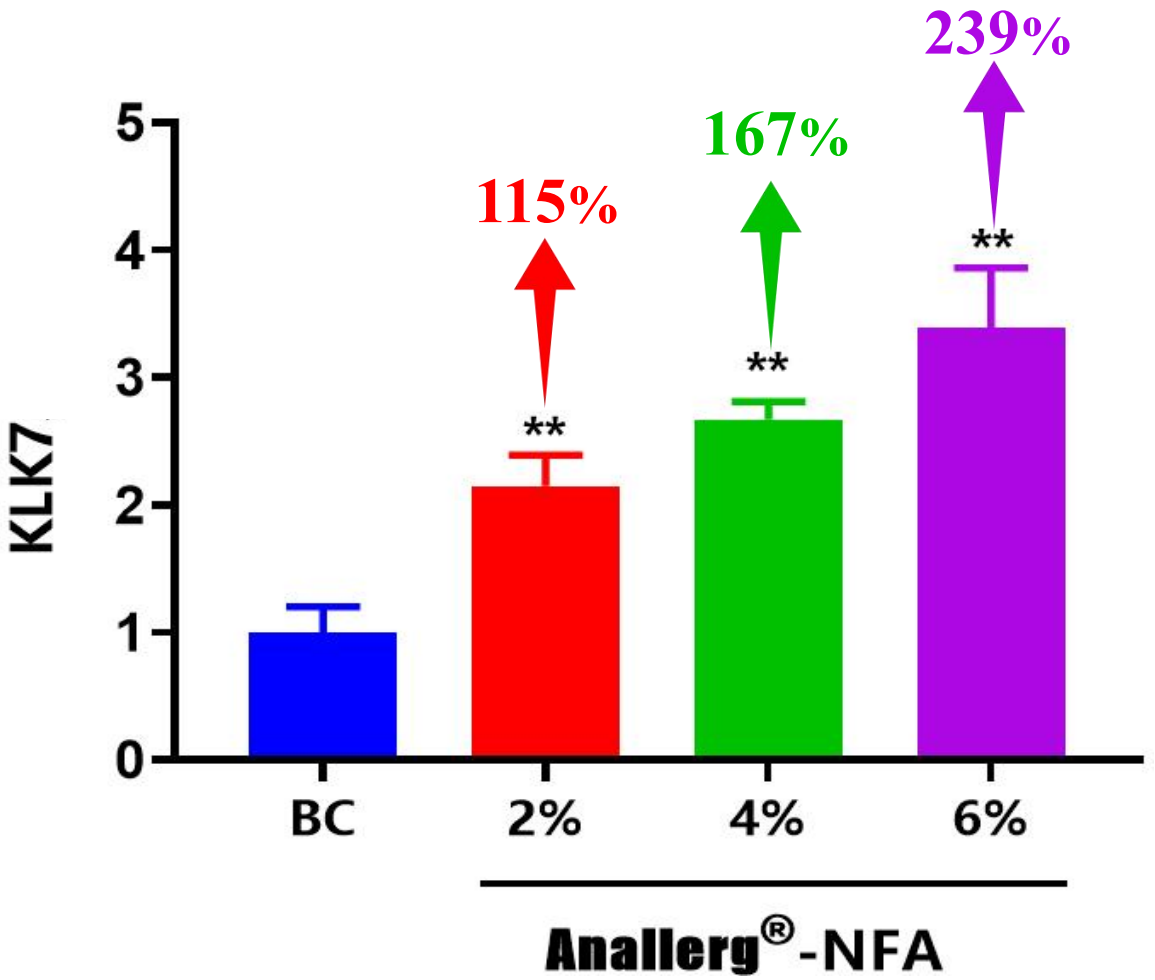
strain	测试浓度（%，v/v%）							
Propionibacterium acnes	0.032%	0.16%	0.8%	1.5%	2%	3%	4%	20%
	Bacterial	Bacterial	Bacterial	Sterile	Sterile	Sterile	Sterile	Sterile

Anallerg®-NFA inhibits *Propionibacterium acnes*

Anallerg®-NFA Promotes stratum corneum renewal

KLK7:

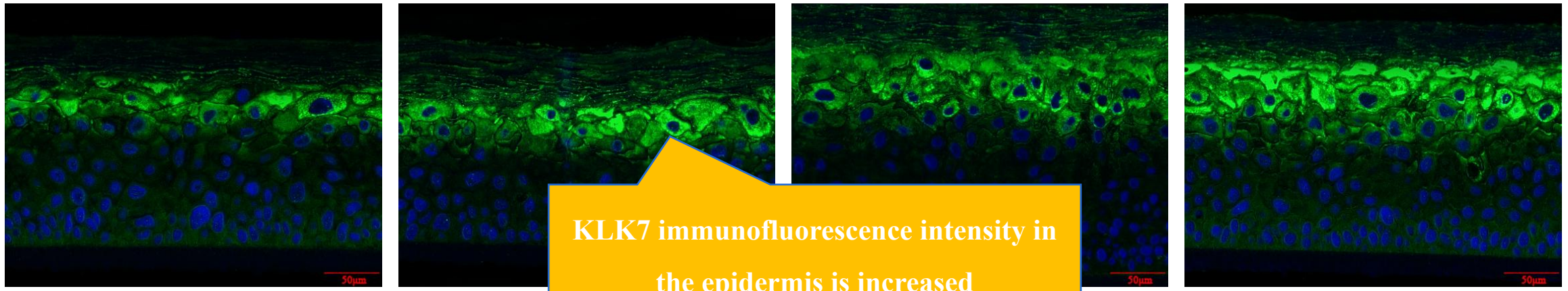
- Found in the basal and upper layers of the stratum granulosum.
- Hydrolyzes corneodesmosome proteins to promote shedding of corneocytes.
- Supports normal epidermal differentiation, migration, and shedding processes.



Anallerg®-NFA showed a significant, dose-dependent promoting effect on KLK7

Anallerg®-NFA Promotes stratum corneum renewal

BC | 2% NFA | 4% NFA | 6% NFA



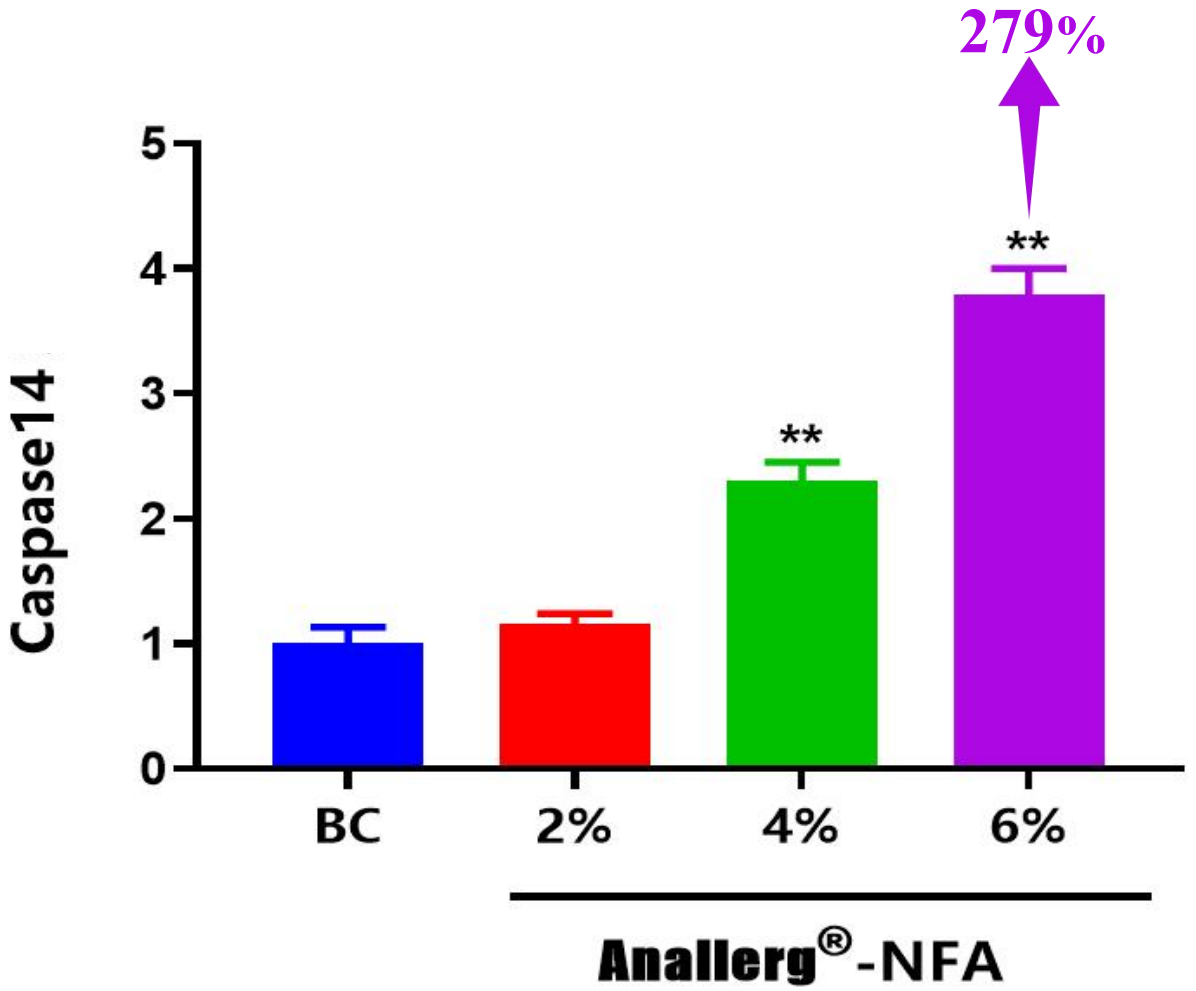
KLK7 immunofluorescence intensity in the epidermis is increased

Anallerg®-NFA showed a significant, dose-dependent promoting effect on KLK7

Anallerg®-NFA Promotes stratum corneum renewal

Caspase-14:

- Found in the stratum corneum and stratum granulosum of the epidermis.
- A key enzyme regulating FLG metabolism.
- Involved in terminal cell differentiation, forming a complete stratum corneum and maintaining the skin barrier function



Anallerg®-NFA showed a significant, dose-dependent promoting effect on Caspase-14

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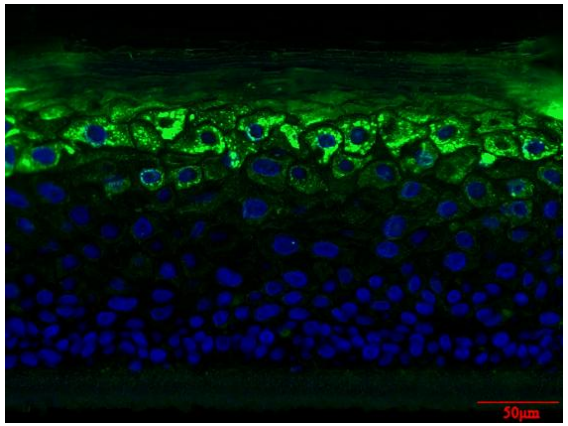
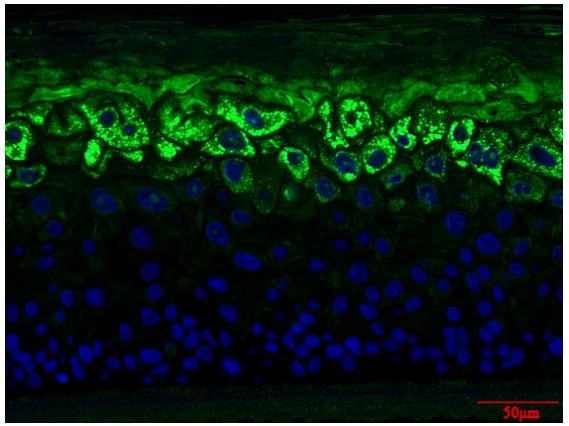
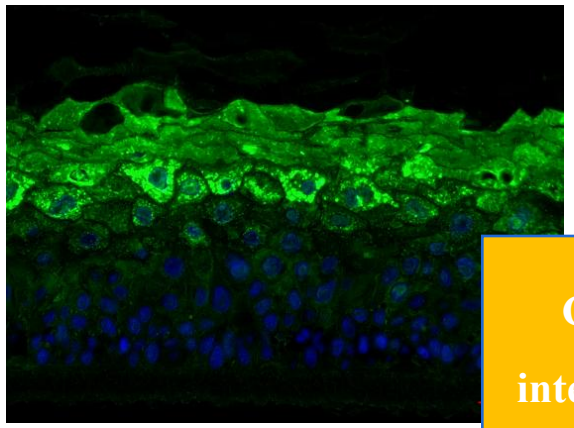
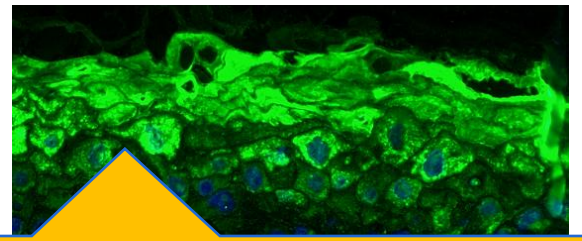






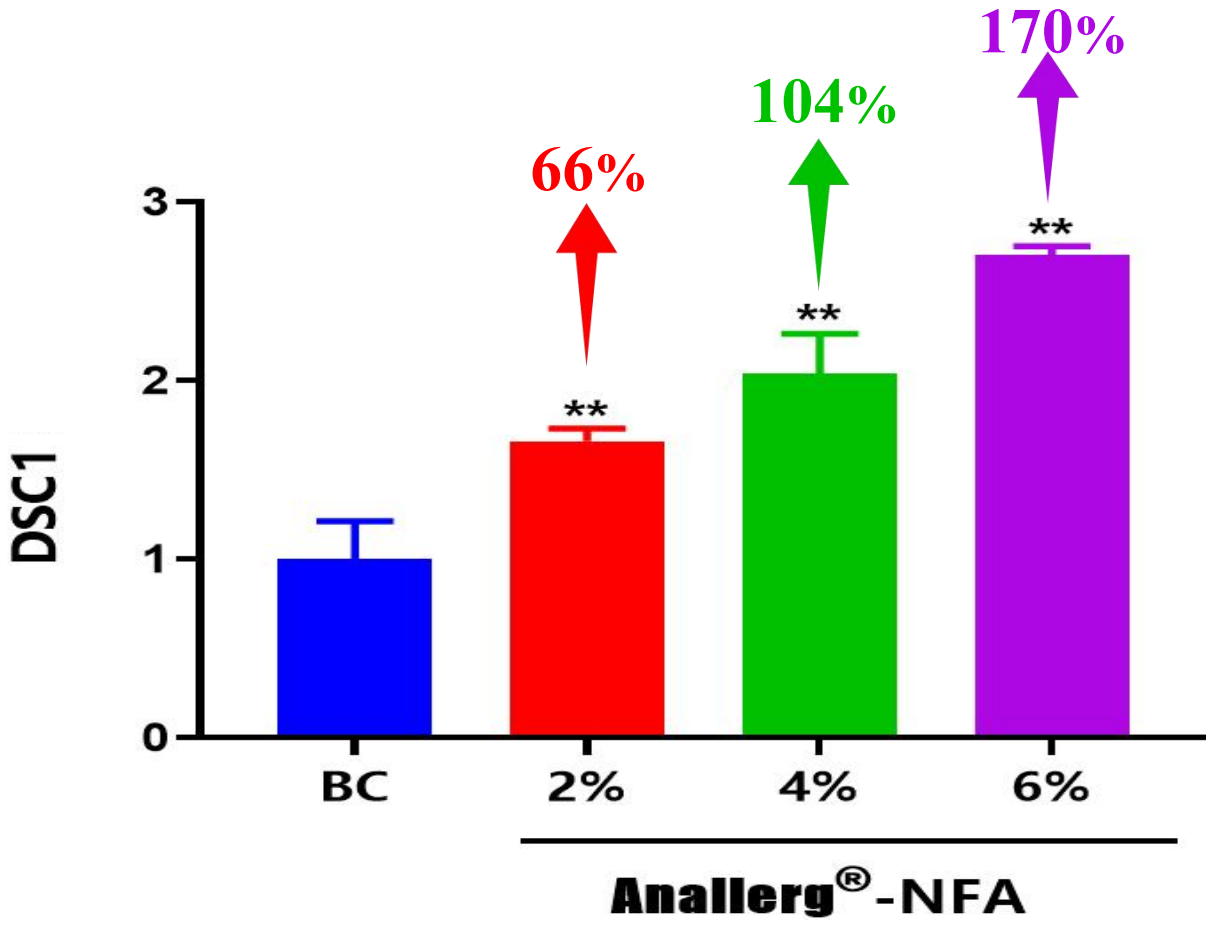


Caspase-14 immunofluorescence intensity in the epidermis is increased

Anallerg®-NFA showed a significant, dose-dependent promoting effect on Caspase-14

Anallerg®-NFA Promotes stratum corneum renewal

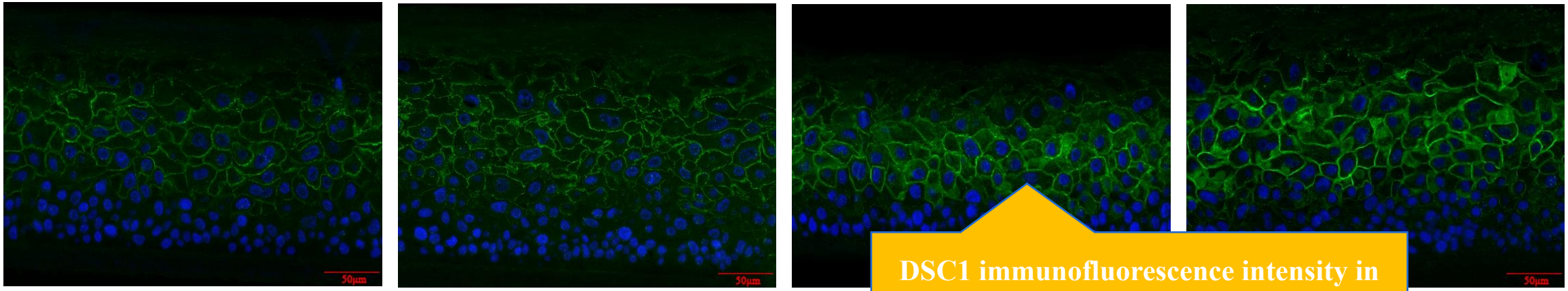
Corneodesmosomes play a key role in strengthening adhesion between corneocytes. **desmocollin (DSC1)** and desmoglein (DSG1) are important components of corneodesmosomes.



Anallerg®-NFA showed a significant, dose-dependent promoting effect on DSC1

Anallerg®-NFA Promotes stratum corneum renewal

BC | 2% NFA | 4% NFA | 6% NFA

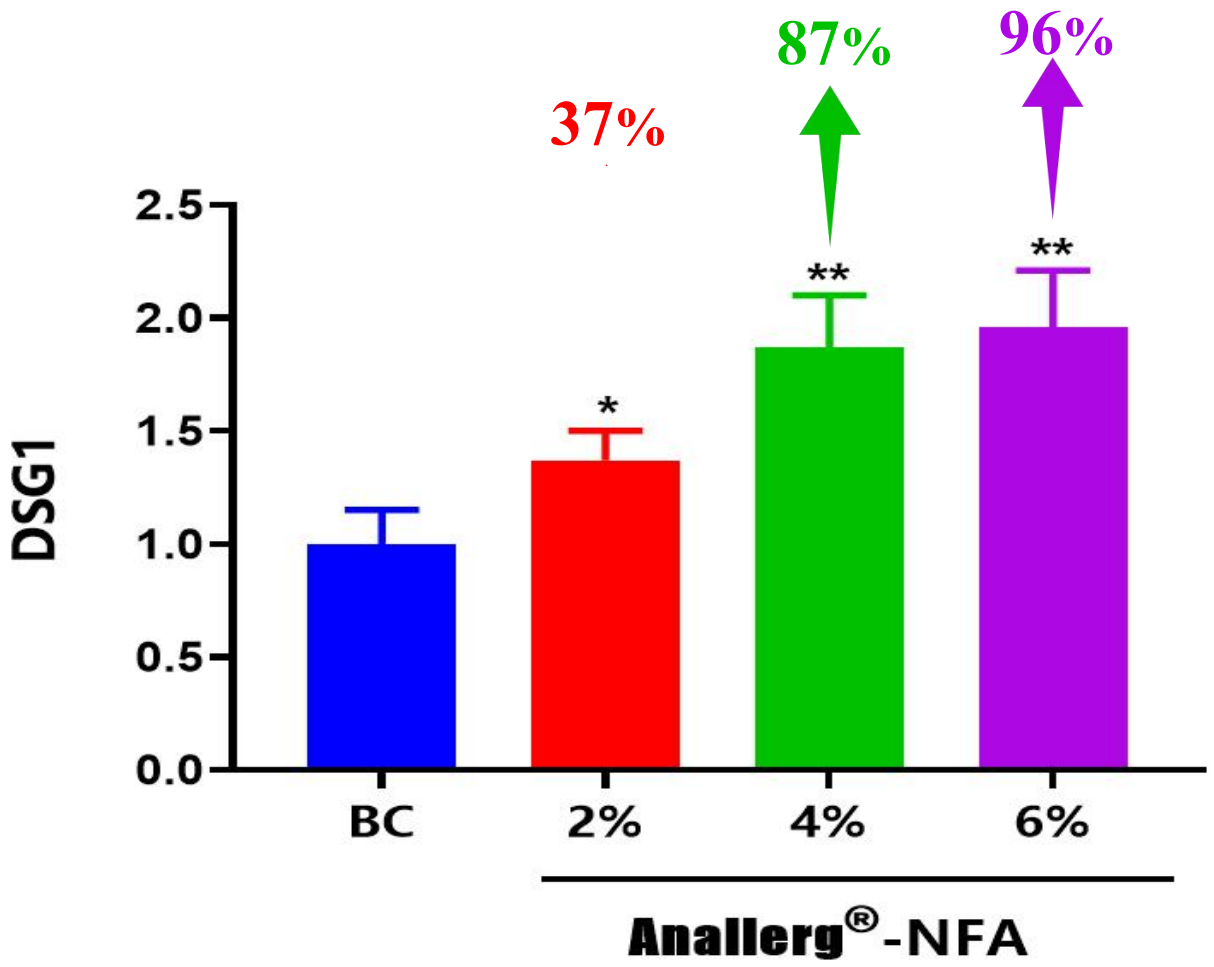


DSC1 immunofluorescence intensity in the epidermis is increased

Anallerg®-NFA showed a significant, dose-dependent promoting effect on DSC1

Anallerg®-NFA Promotes stratum corneum renewal

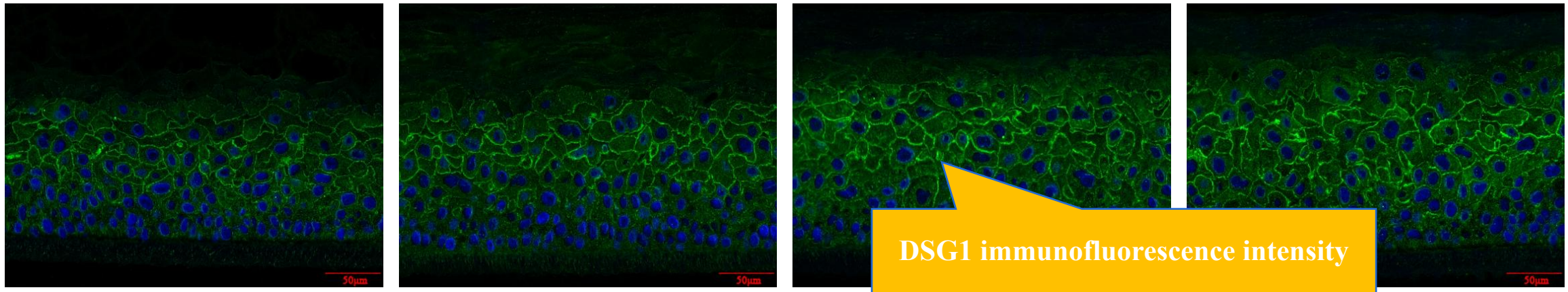
Corneodesmosomes play a key role in strengthening adhesion between corneocytes. desmocollin (DSC1) and **desmoglein (DSG1)** are important components of corneodesmosomes.



Anallerg®-NFA showed a significant, dose-dependent promoting effect on DSG1

Anallerg®-NFA Promotes stratum corneum renewal

BC | 2% NFA | 4% NFA | 6% NFA



Anallerg®-NFA showed a significant, dose-dependent promoting effect on DSC1

Anallerg®-NFA Clinical trials

- 32 candidates (4% Anallerg®-NFA serum) for 2 to 4 weeks.

◆ Reduces pigmentation

✓ Average pigmentation

◆ Minimizes Pores

✓ Pore area, pore volume

◆ Makes skin smoother

✓ Skin roughness Ra value

◆ Brightens and reduces yellowish tones

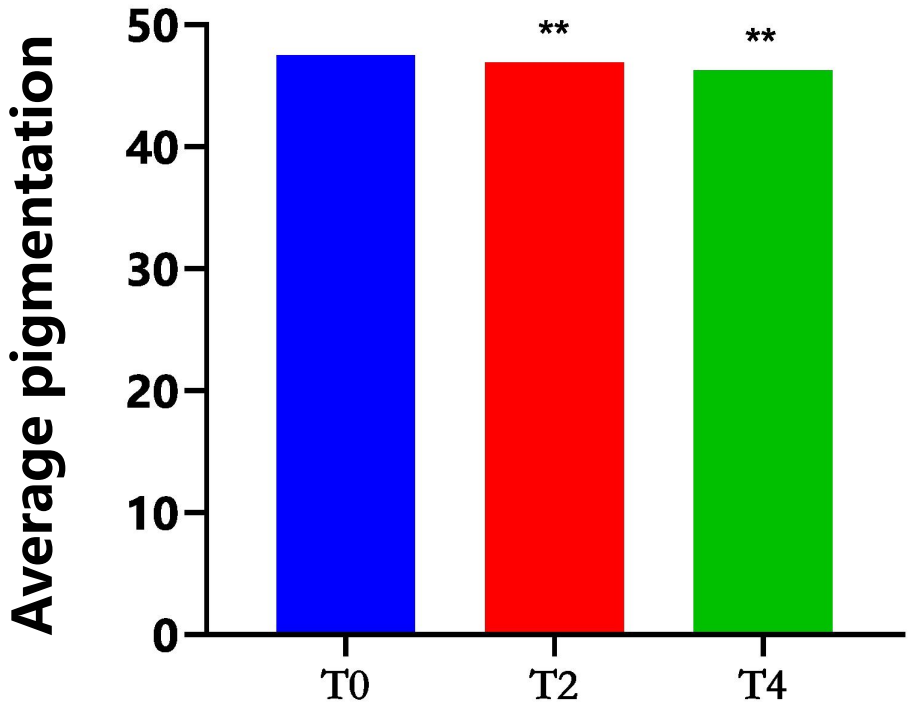
✓ Skin glossiness, skin yellowish tones b* value

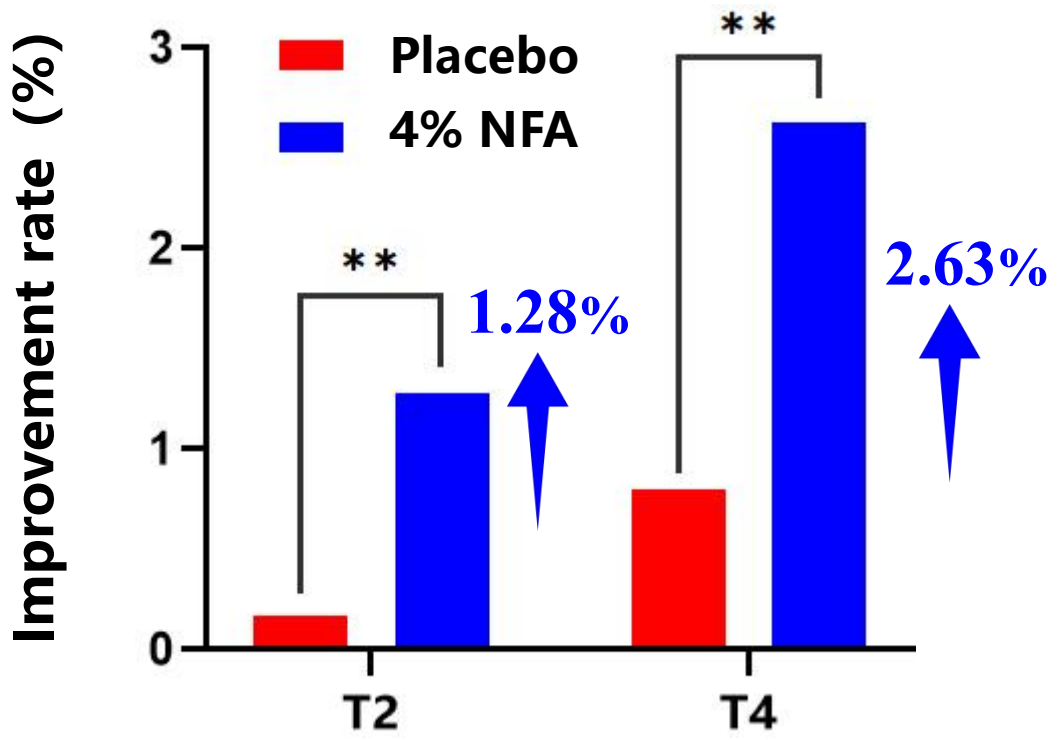
◆ Anti-wrinkles and firming

✓ R2 value

✓ The length and depth of fine lines and wrinkles

Anallerg®-NFA Reduces pigmentation



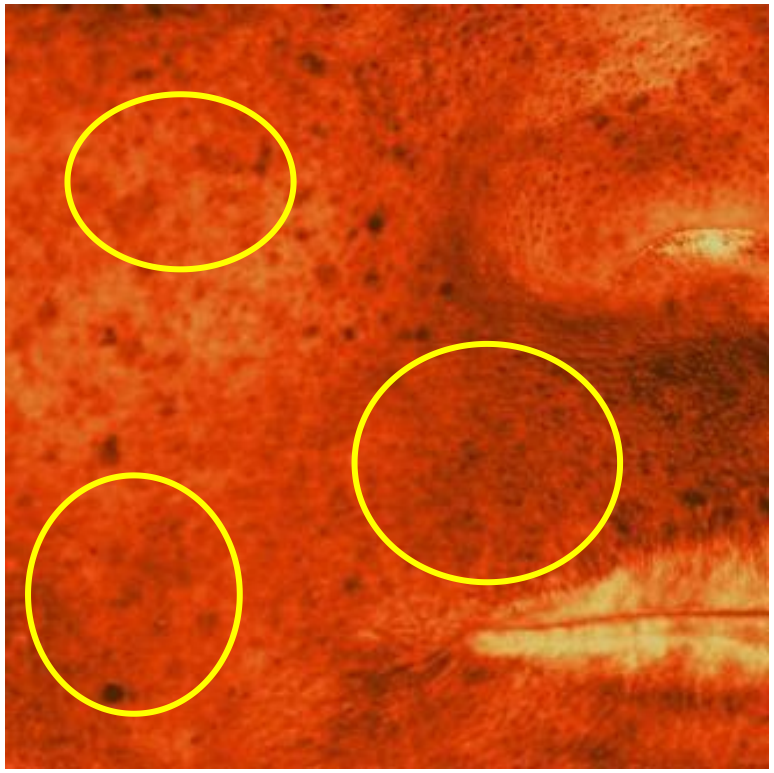


Anallerg®-NFA significantly reduced skin pigmentation

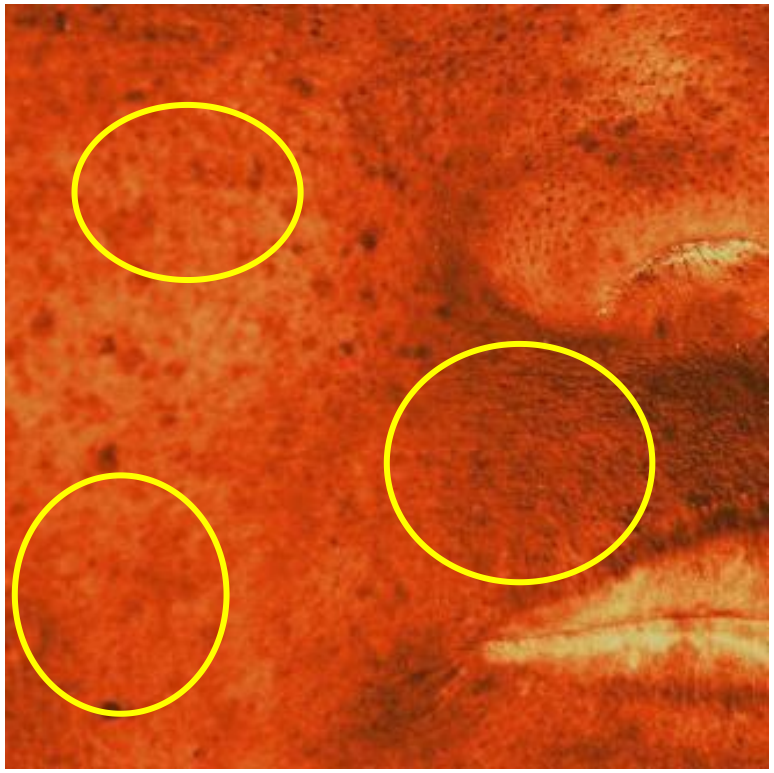
The data is sourced from third-party testing agencies

Anallerg®-NFA Reduces pigmentation

Before



After



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Anallerg®-NFA Reduces pigmentation

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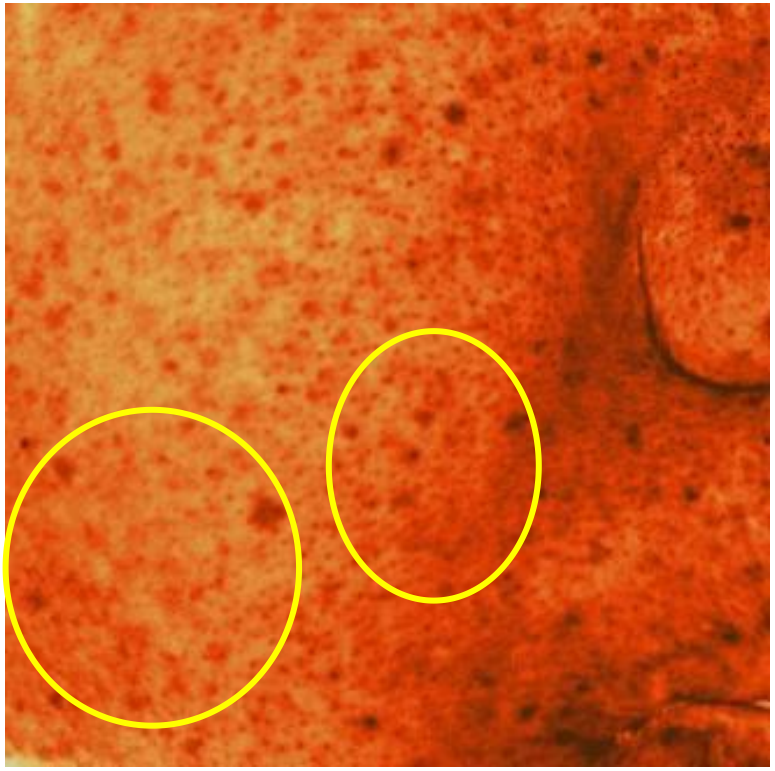
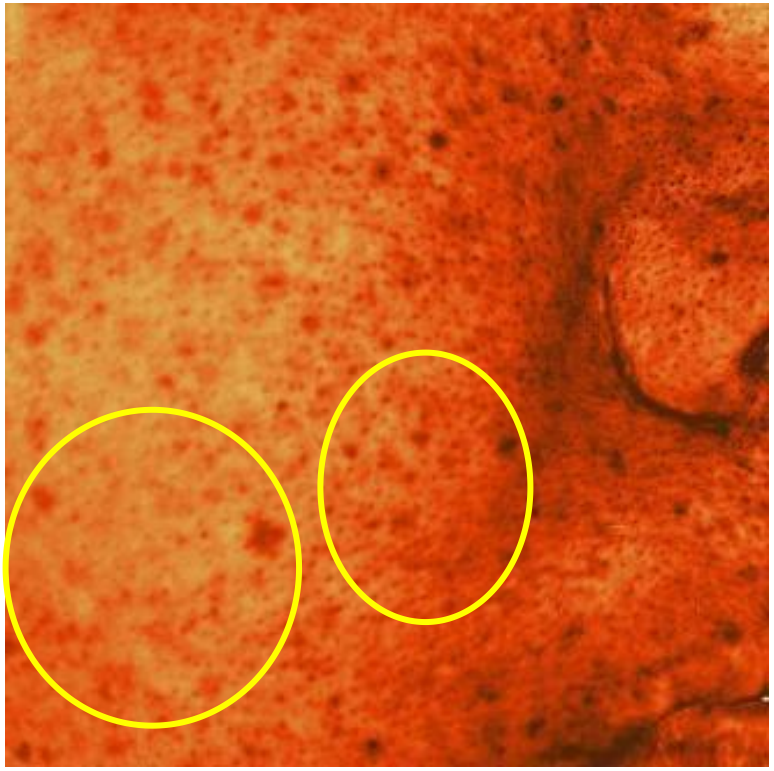


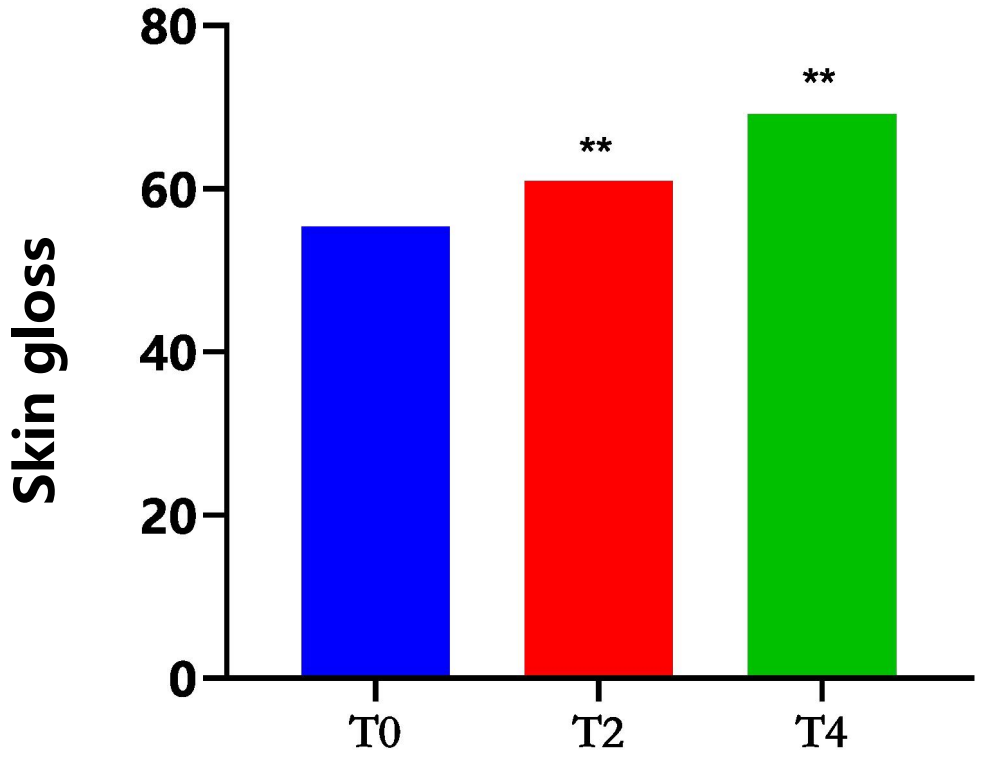
After

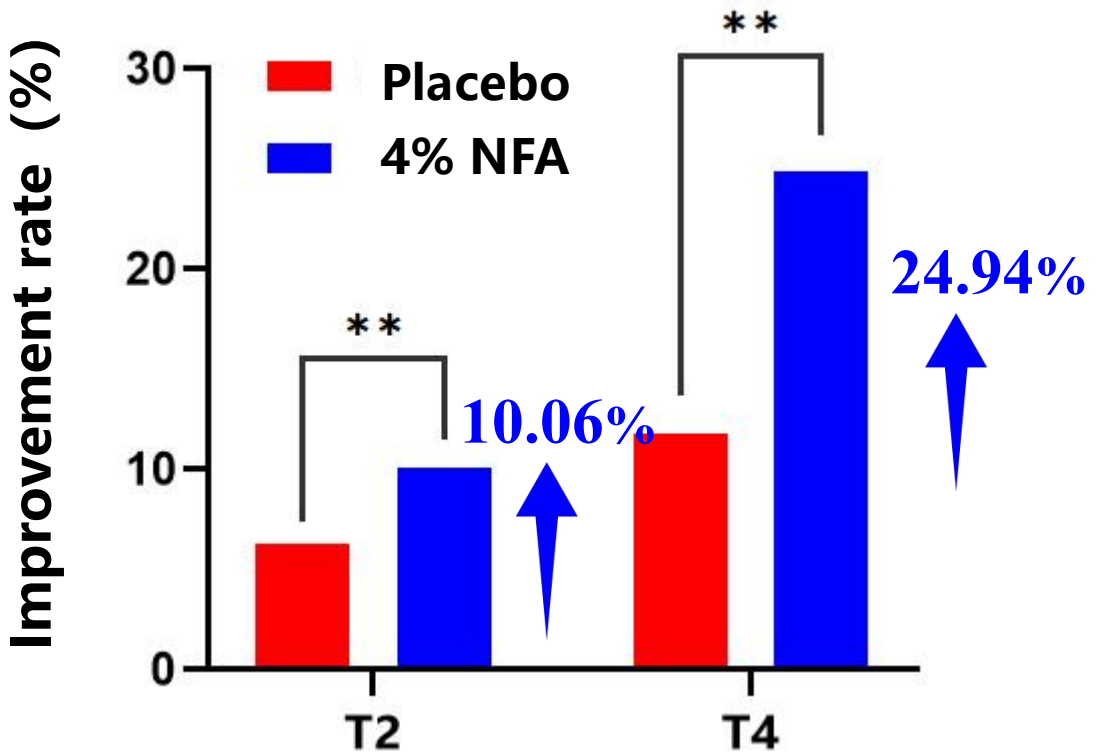


Anallerg®-NFA significantly reduced skin pigmentation

The data is sourced from third-party testing agencies

Anallerg®-NFA Brightens and reduces yellowish tones

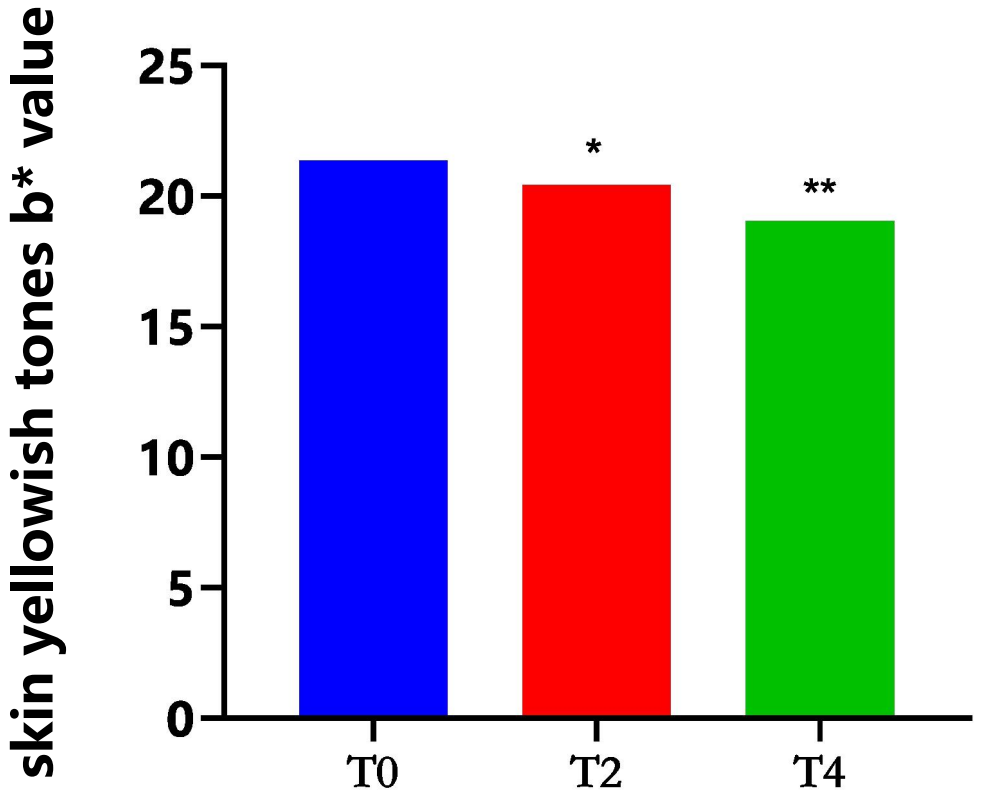


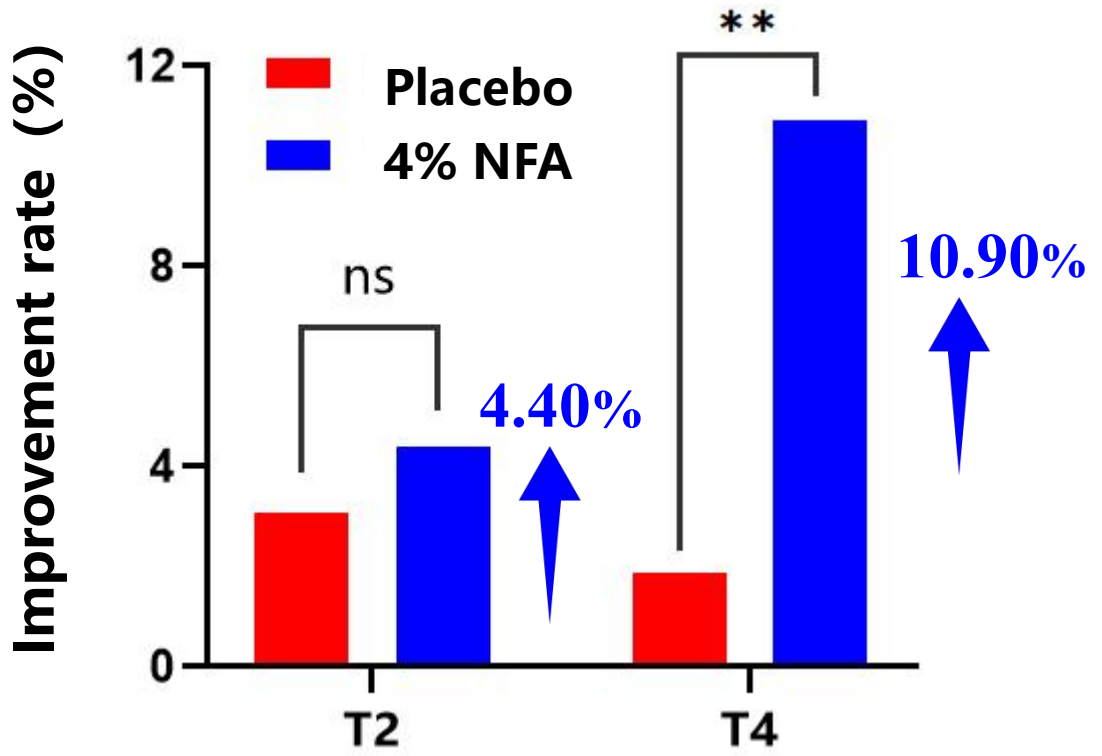


Anallerg®-NFAsignificantly improved skin radiance

The data is sourced from third-party testing agencies

Anallerg®-NFA Brightens and reduces yellowish tones

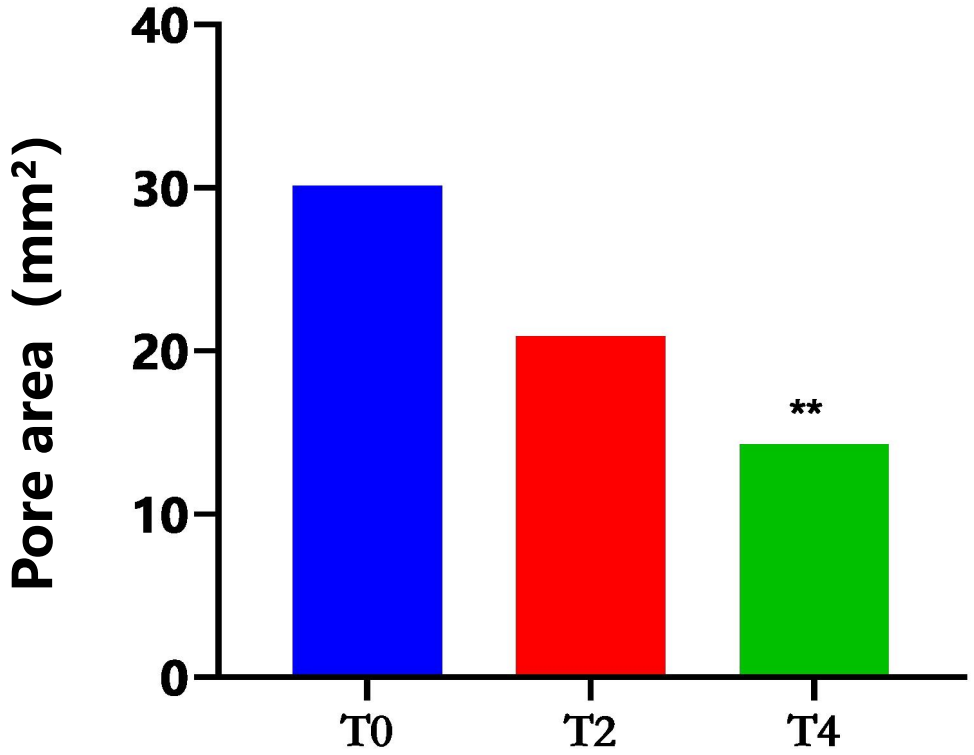


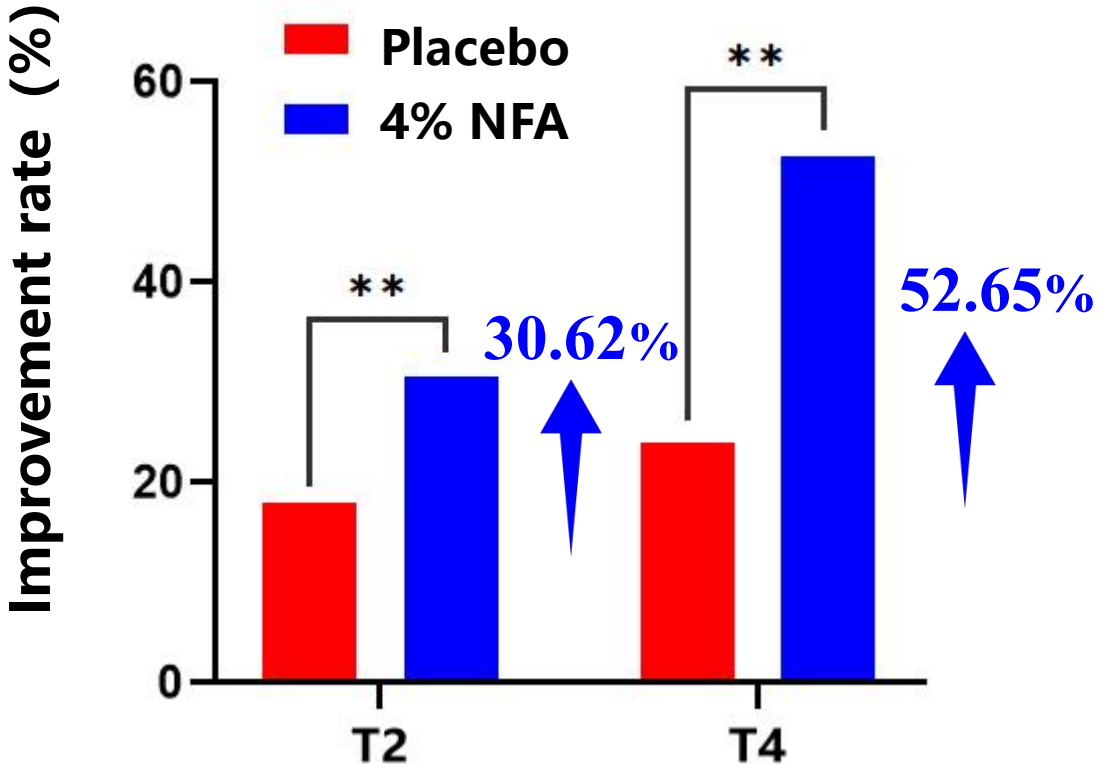


Anallerg®-NFAsignificantly reduced yellowish tones

The data is sourced from third-party testing agencies

Anallerg®-NFA Minimizes pores (Area)

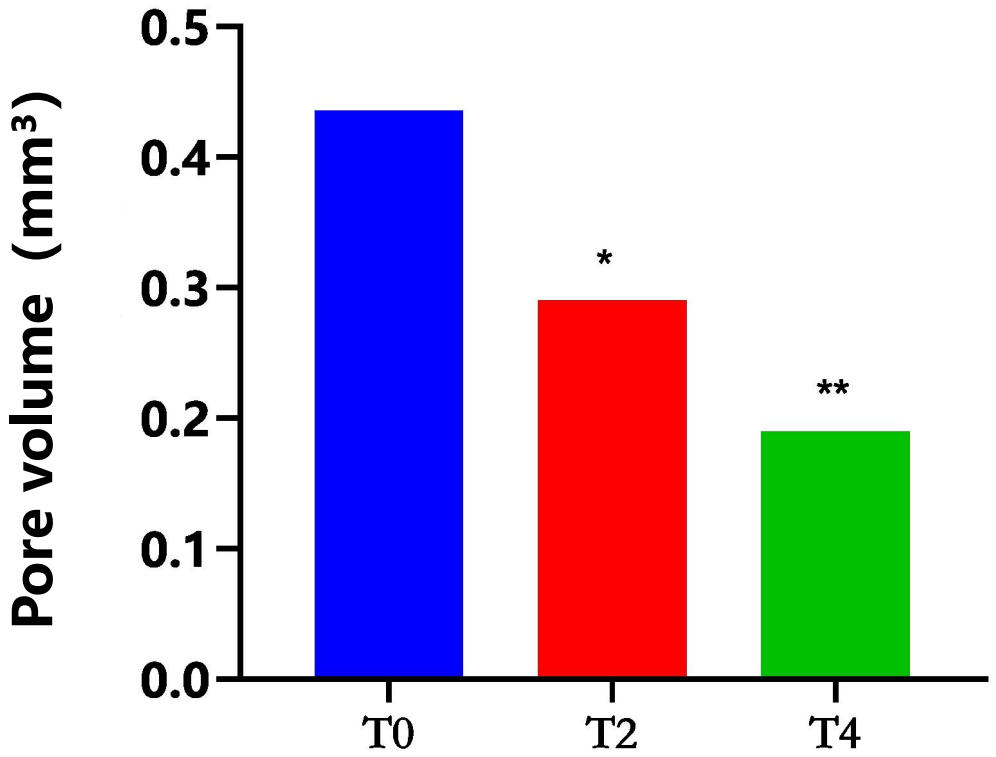


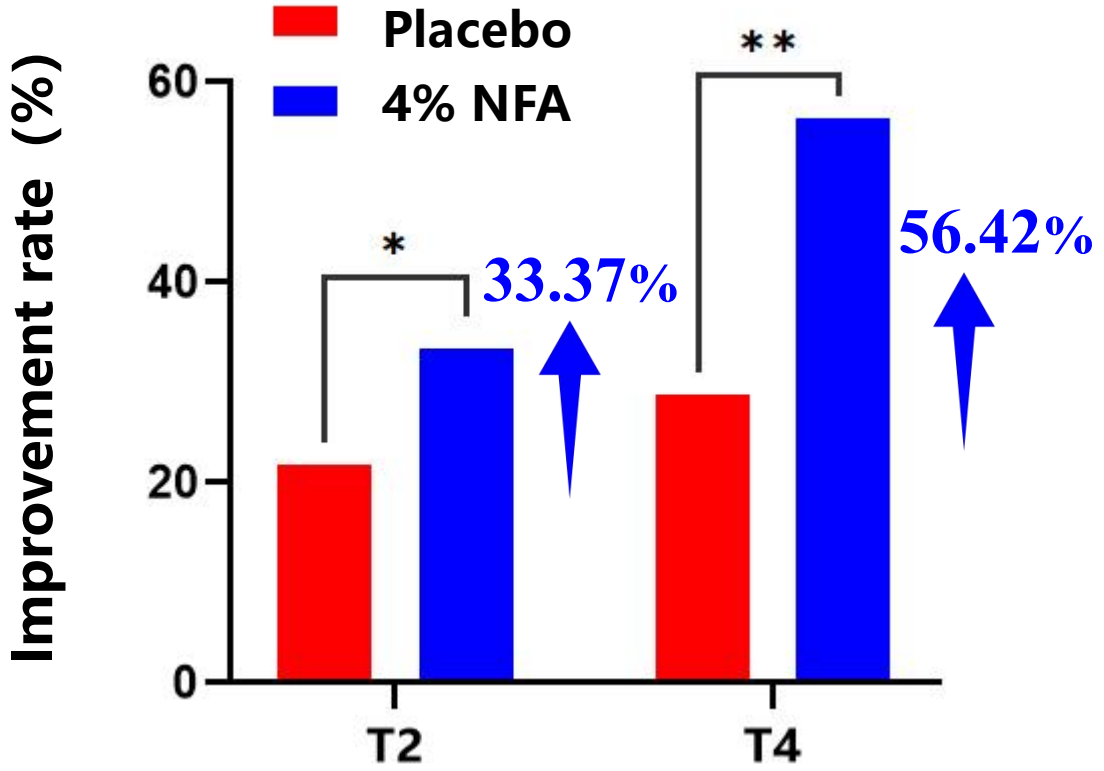


Anallerg®-NFAsignificantly minimized pores area

The data is sourced from third-party testing agencies

Anallerg®-NFA Minimizes pores (volume)

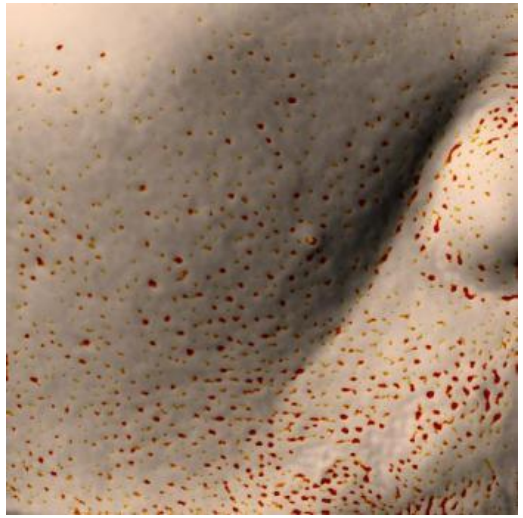
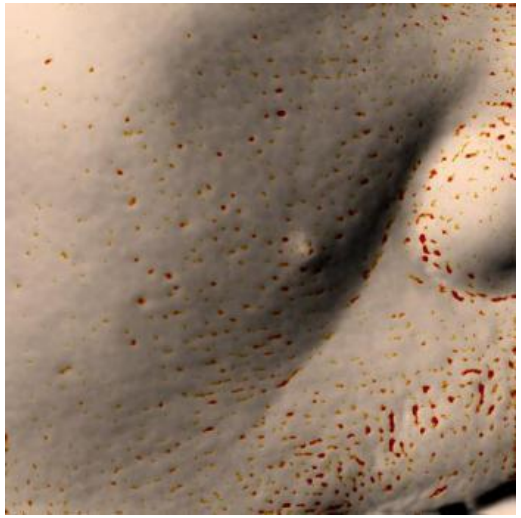
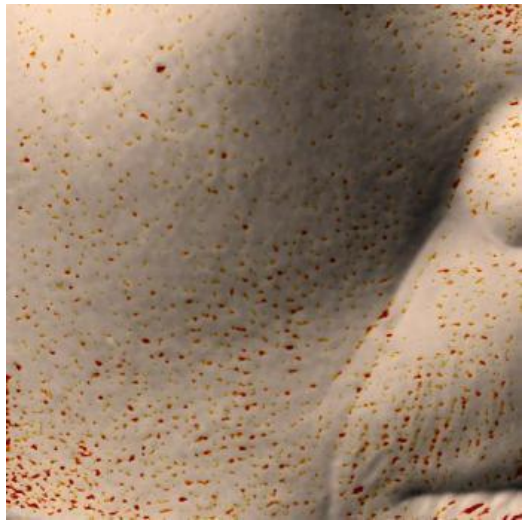




Anallerg®-NFAsignificantly minimized pores volume

The data is sourced from third-party testing agencies

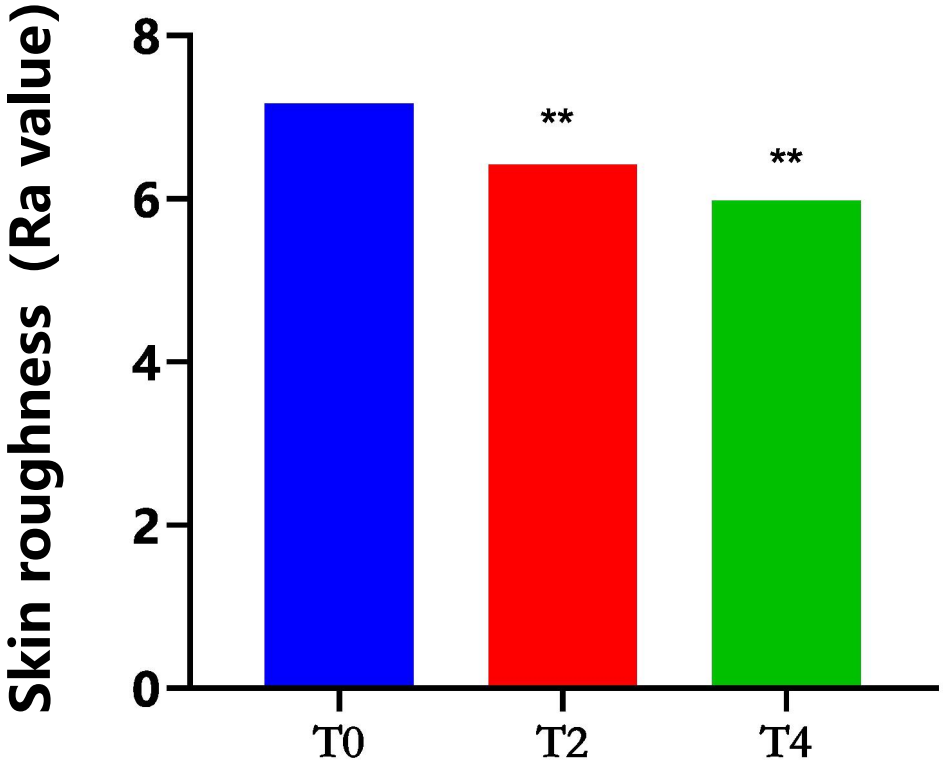
Anallerg®-NFA Minimizes pores

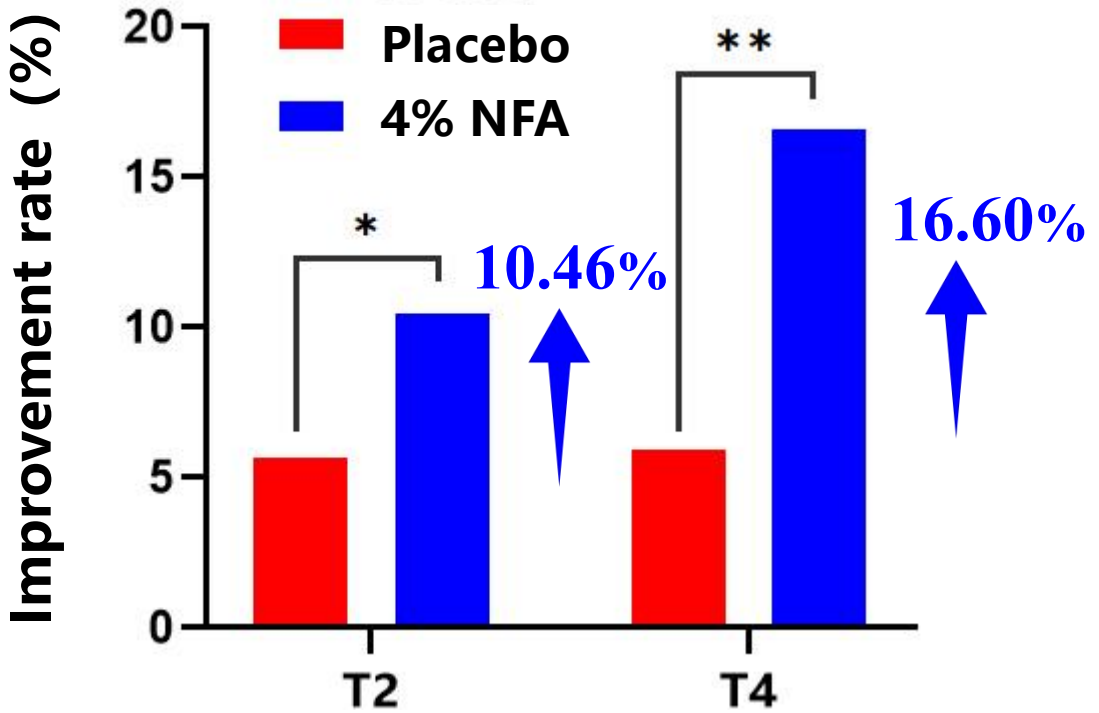
Before	After	Before	After
			

Anallerg®-NFAsignificantly minimized pores

The data is sourced from third-party testing agencies

Anallerg®-NFA Makes skin smoother



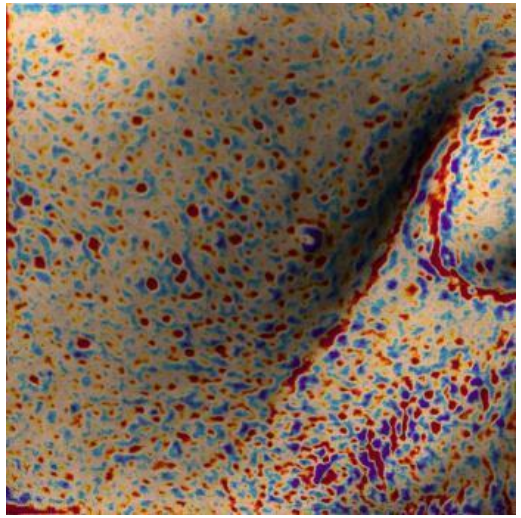


Anallerg®-NFAsignificantly made skin smoother

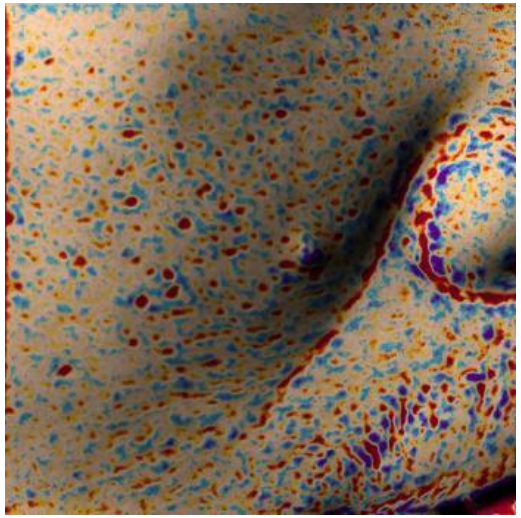
The data is sourced from third-party testing agencies

Anallerg®-NFA Makes skin smoother

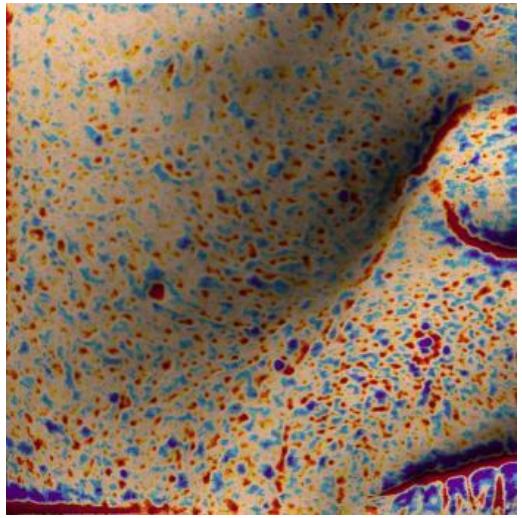
Before



After



Before



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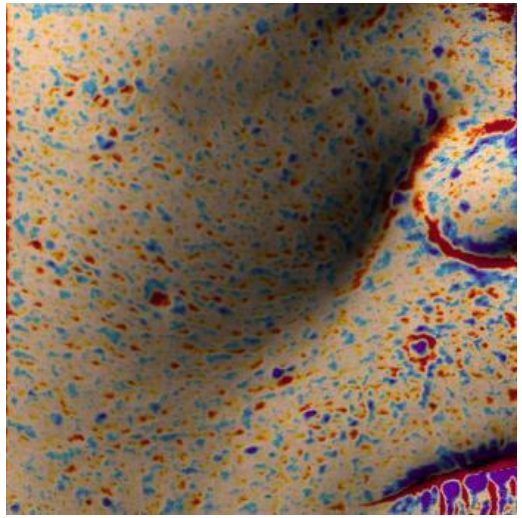
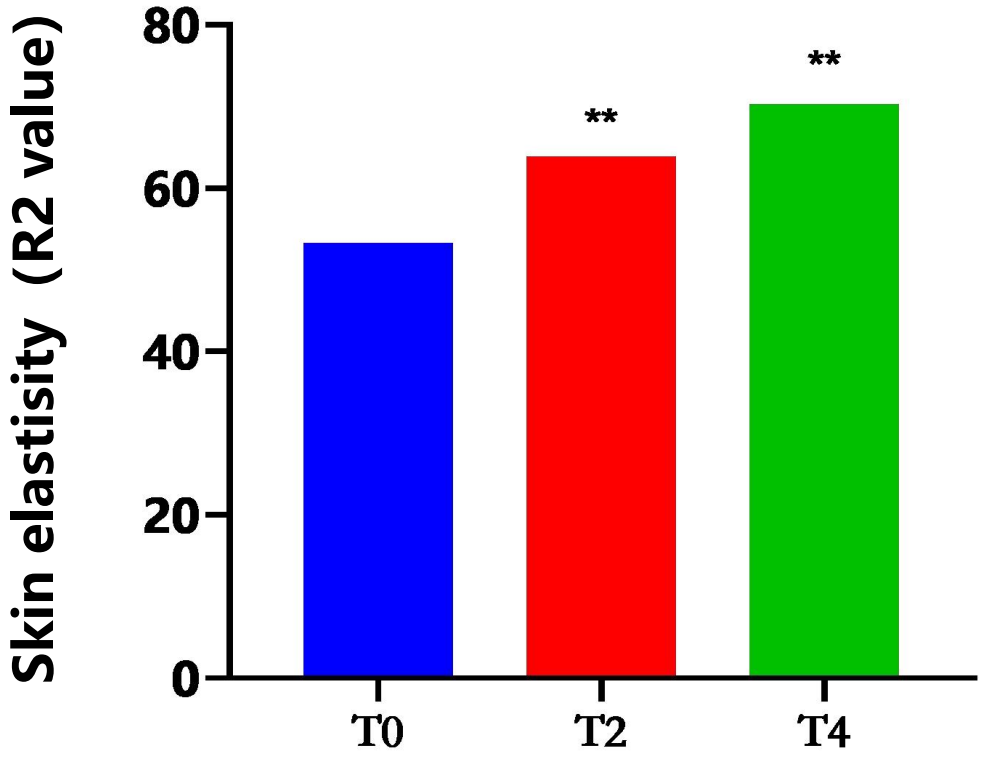
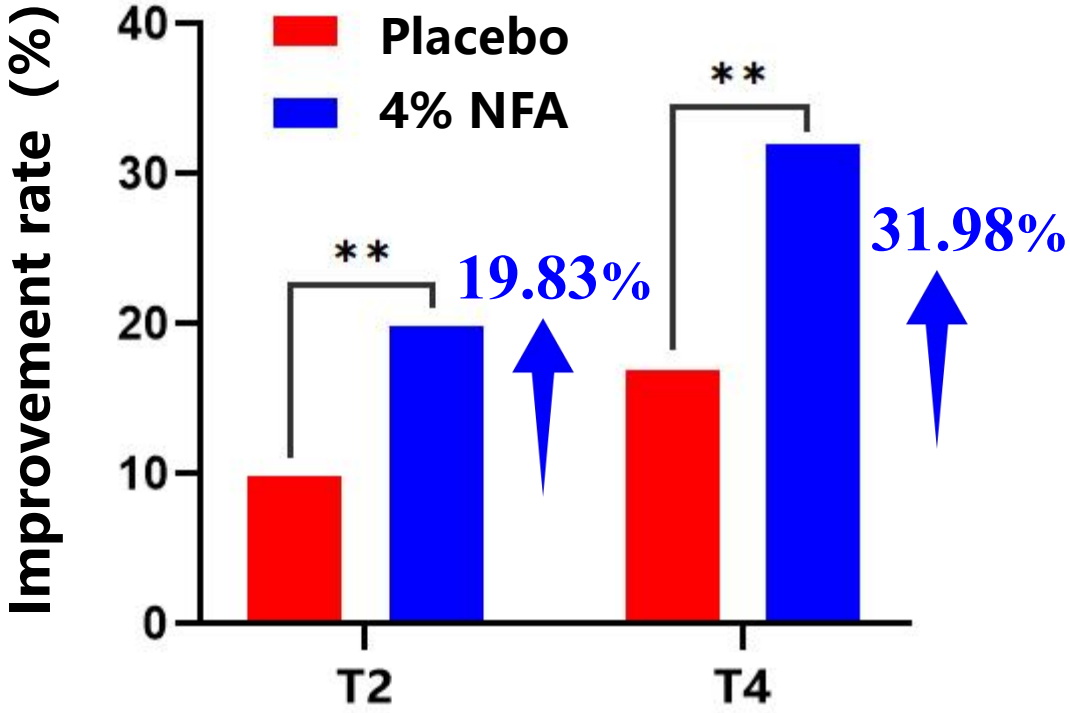


Anallerg®-NFAsignificantly made skin smoother

The data is sourced from third-party testing agencies

Anallerg®-NFA Improved skin elasticity

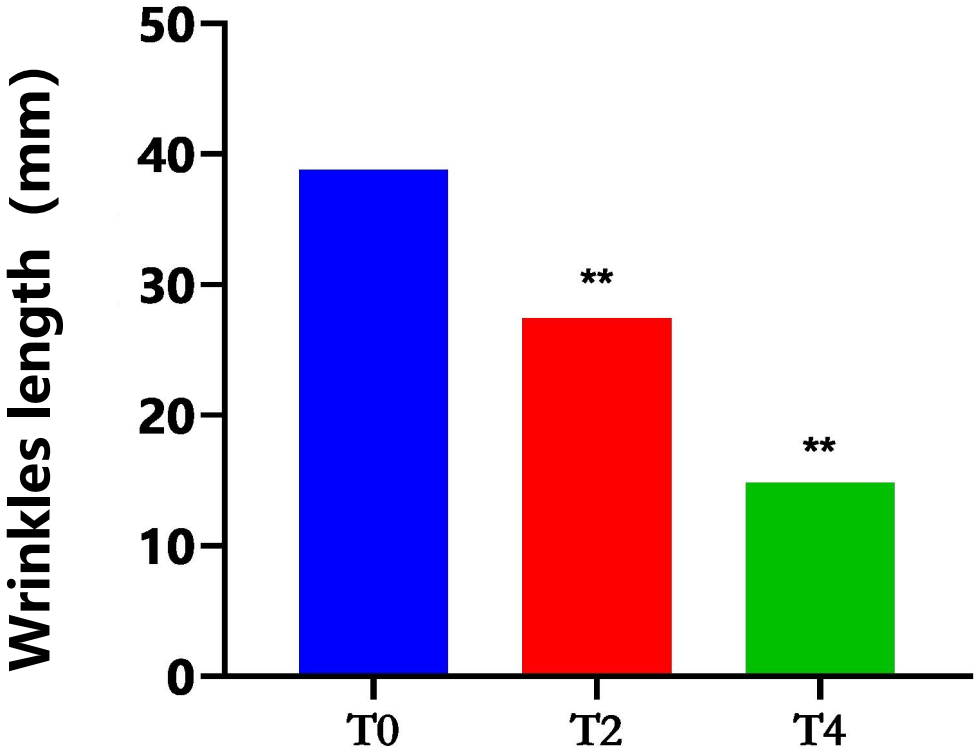


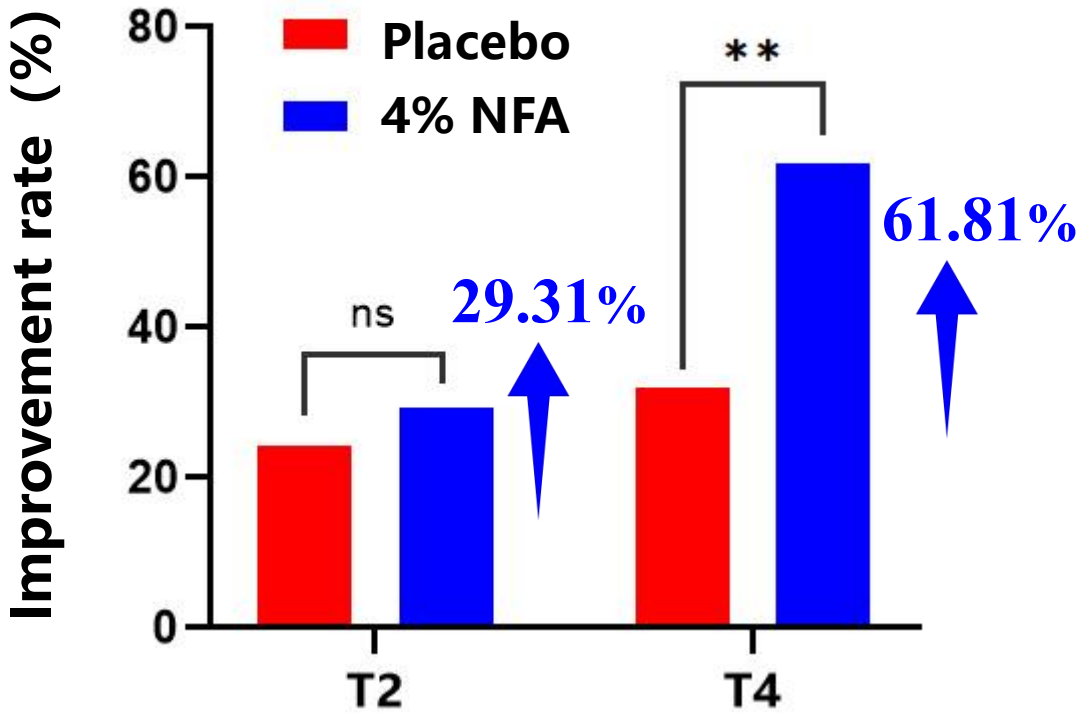


Anallerg®-NFA significantly improved skin elasticity

The data is sourced from third-party testing agencies

Anallerg®-NFA Anti-wrinkles (length)

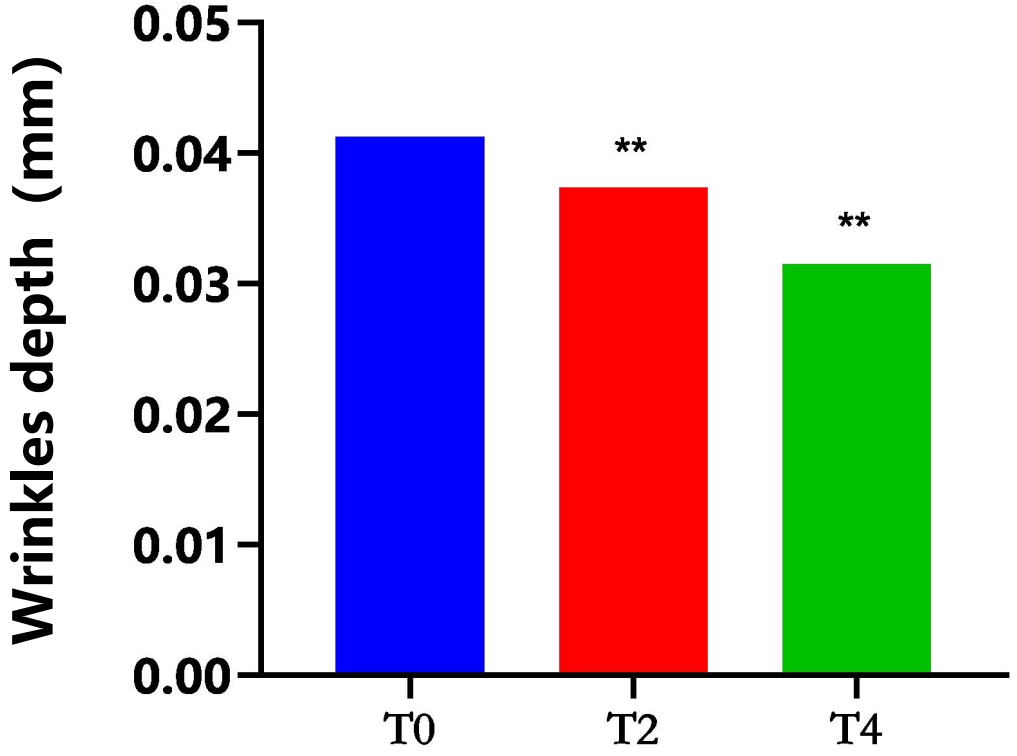


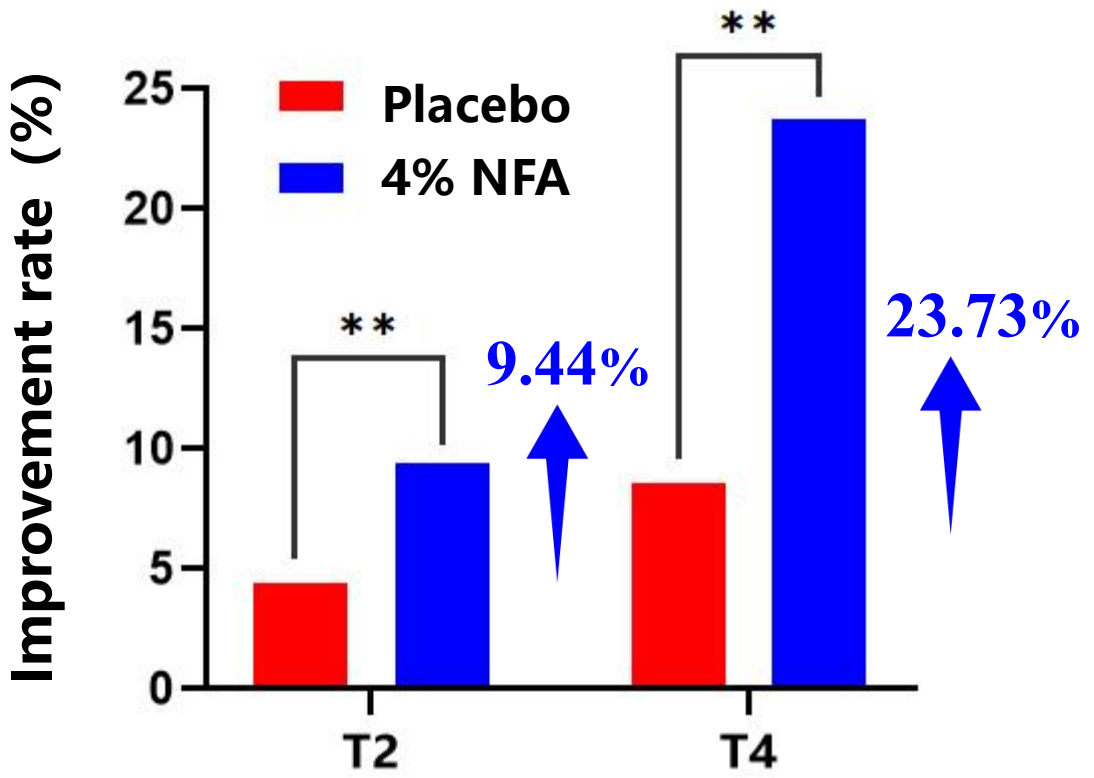


Anallerg®-NFA significantly reduced the length of wrinkles

The data is sourced from third-party testing agencies

Anallerg®-NFA Anti-wrinkles (depth)

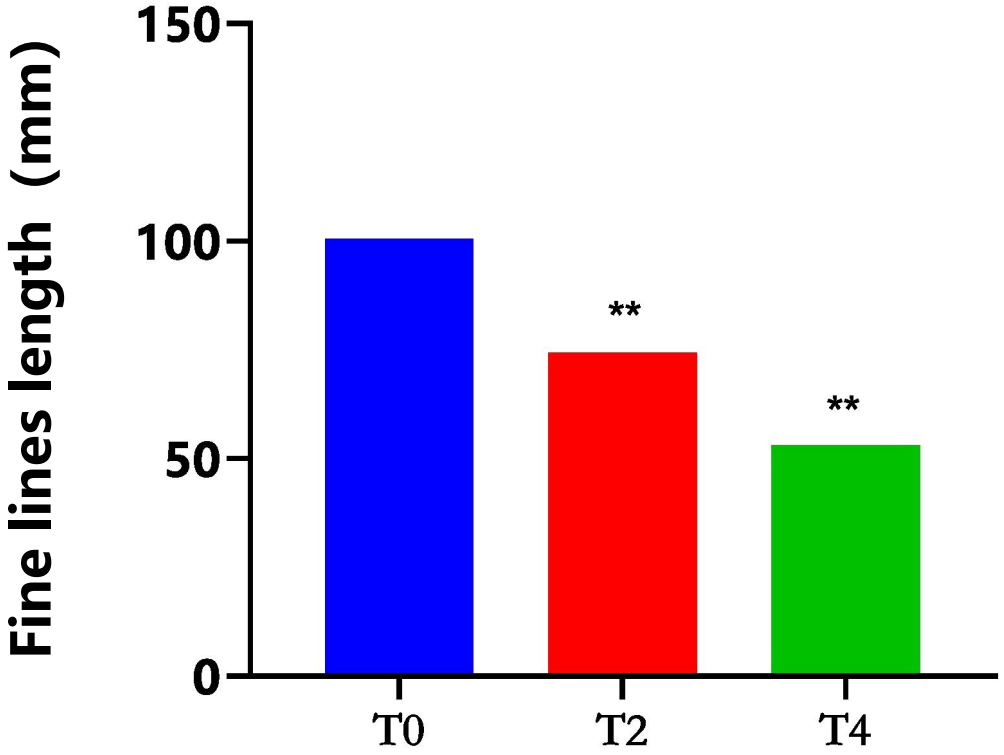


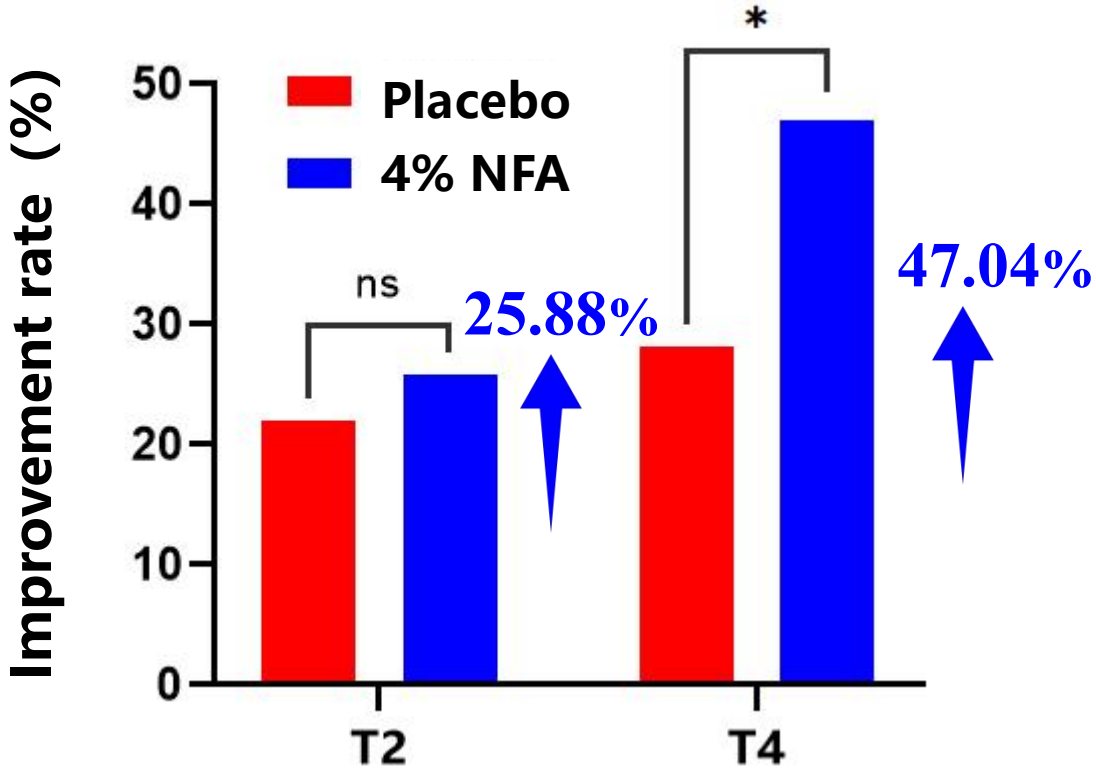


Anallerg®-NFA significantly reduced the depth of wrinkles

The data is sourced from third-party testing agencies

Anallerg®-NFA Reduces fine lines (length)

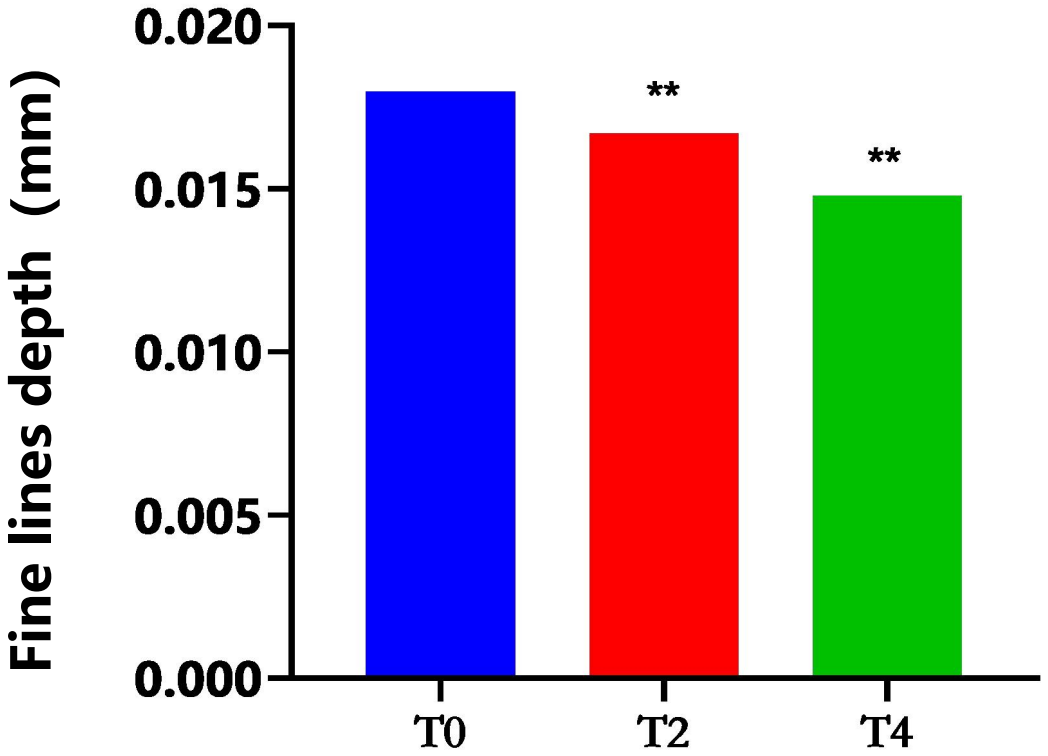


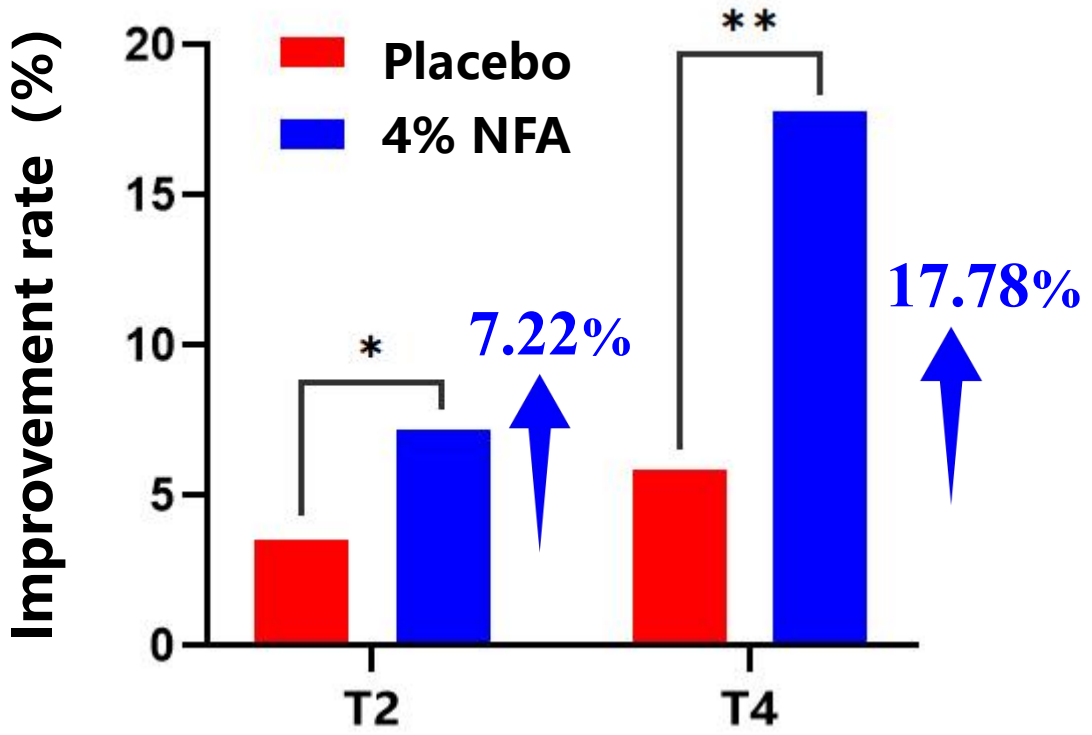


Anallerg®-NFA significantly reduced the length of fine lines

The data is sourced from third-party testing agencies

Anallerg®-NFA Reduces fine lines (depth)



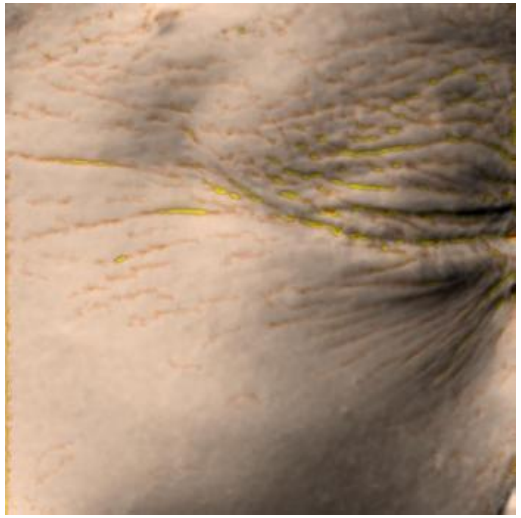


Anallerg®-NFA significantly reduced the depth of fine lines

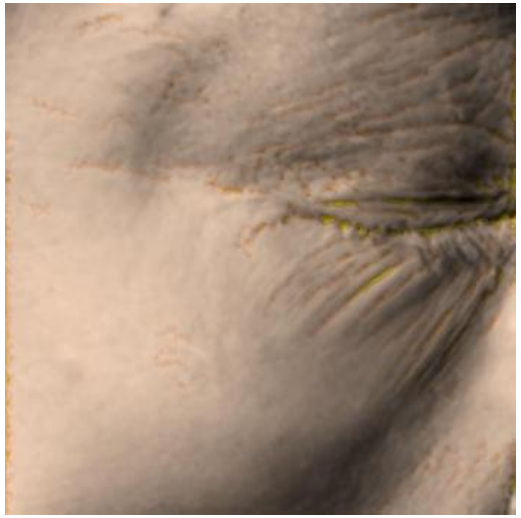
The data is sourced from third-party testing agencies

Anallerg®-NFA Anti-wrinkles

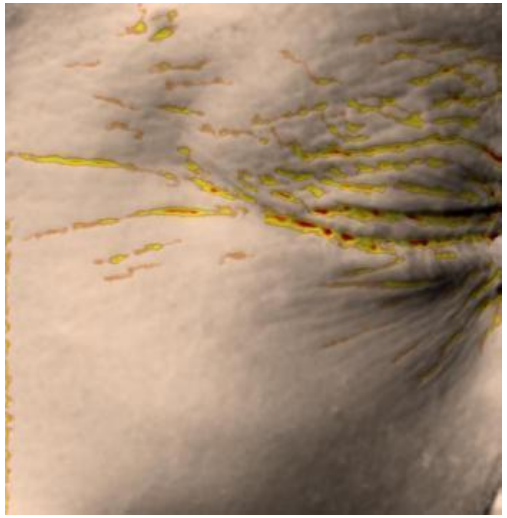
Before



After



Before



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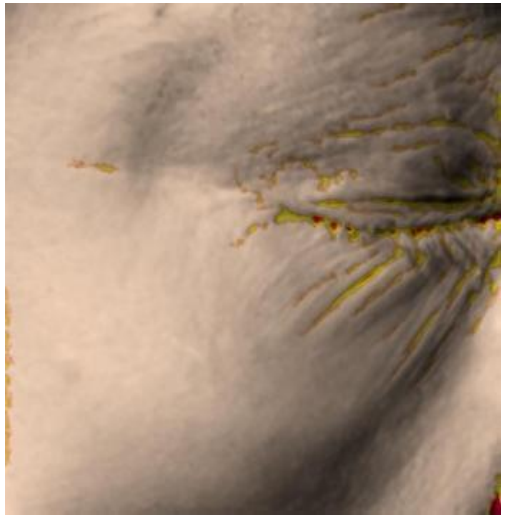
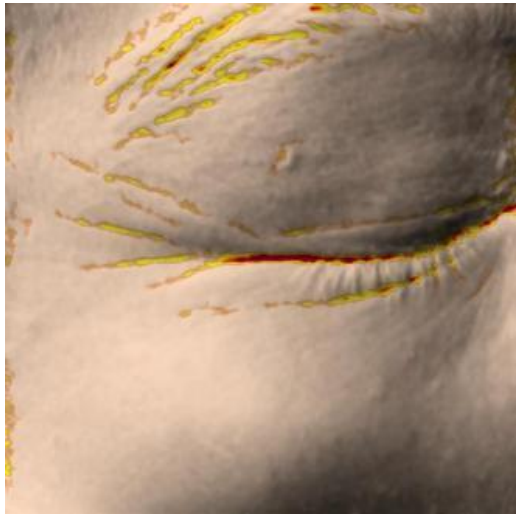


Anallerg®-NFA significantly reduced wrinkles

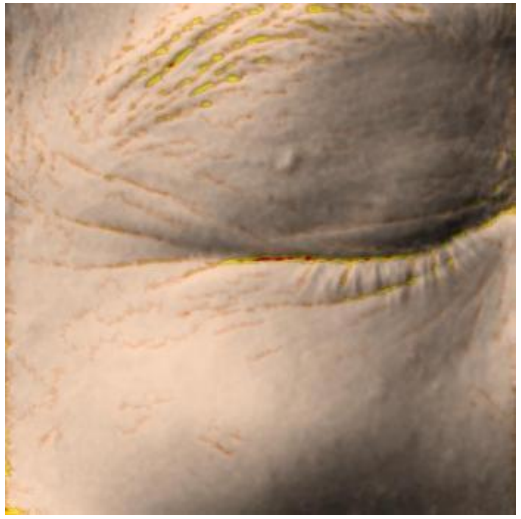
The data is sourced from third-party testing agencies

Anallerg®-NFA Anti-wrinkles

Before

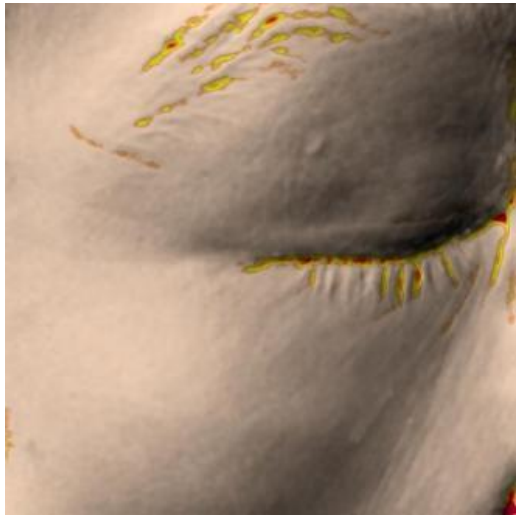


After



Before

After



Anallerg®-NFA significantly reduced wrinkles

The data is sourced from third-party testing agencies

Anallerg®-NFA Human skin patch test

Group	Number of people	Testing time	Number of people experiencing adverse skin reactions				
			0	1	2	3	4
NFA（6%）	30	0.5h	30	0	0	0	0
		24h	30	0	0	0	0
		48h	30	0	0	0	0
NFA（20%）	30	0.5h	30	0	0	0	0
		24h	30	0	0	0	0
		48h	30	0	0	0	0

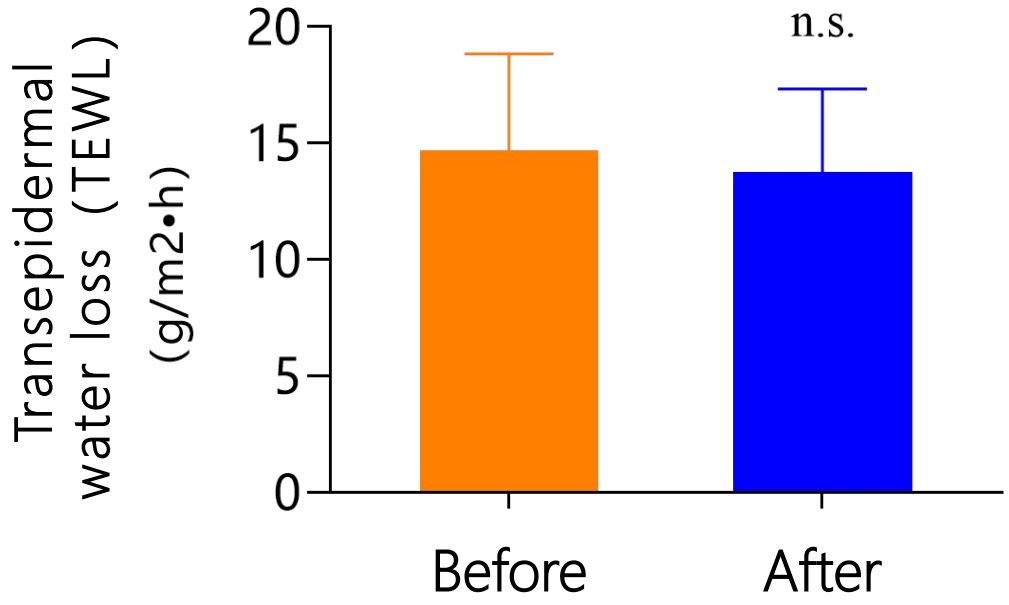
Anallerg®-NFA is safe !

数据来自第三方检测机构

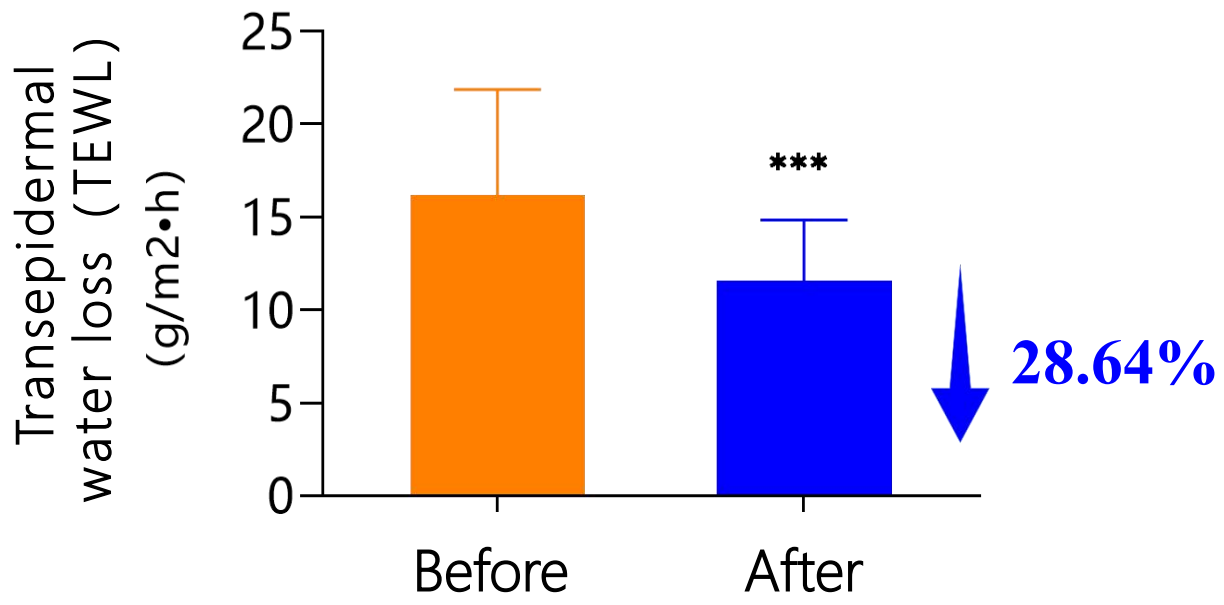
Anallerg®-NFA Transepidermal water loss (TEWL)

➢31 subjects used 4% NFA serum for 4 weeks:

Blank Control



4% NFA serum



The TEWL value of the skin is significantly reduced, meaning NFA can repair the skin barrier

0 3

Product Information

Anallerg®-NFA

- **INCI: Maltobionic Acid**
- **Appearance: White to off-white powder**
- **Recommended Addition Amount Based on Ingredient Compatibility: 0.1%-6.0%**
- **Applications:**

- **Functions: Cosmetic pH regulator, skin protectant, moisturizer, antioxidant, anti-glycation agent, anti-aging agent**
- **Usage: Recommended to add directly to the formulation at 45°C, or it can be pre-dissolved into an aqueous solution.**
- **Suitable for: Water-based products, masks, creams, lotions, and lyophilized powders.**
- **Storage Conditions: Store in a sealed, light-protected container at temperatures below 10°C.**


THANKS